



ISO Gem Laboratory System ISO/IEC 17025: 2017 Diamond Test Standard

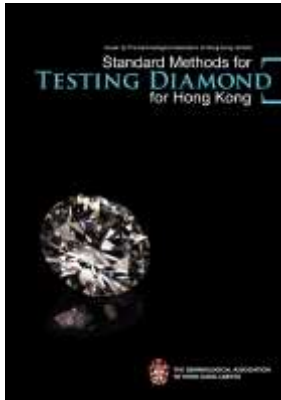
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ANAB, GAC, HKAS & IAS Lead Assessor
International Evaluator on ILAC & IAF

Diamond Verification and Grading

鑽石真偽鑑定及4C評級



2008-02-28
Edition



Diamond Grading Standard



Which Diamond Standard ?

參考國際
鑽石技術
報告



參考國際
鑽石最後
草議標準



Chinese
Diamond
Standard ?

參考中国
鑽石標準

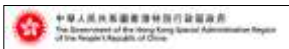


World Jewellery
Confederation

根據Cibjo 鑽石
標準為香港標準

製定本地需要
附加鑽石規範

7 HK Test Standard Methods



Laws passed by the
HK Legislative Council
Enacted on 2 March 2009

Trade Description Ordinance
HK Law Chapter 362K & 362L
Fei Cui and Diamond



What is Diamond ?

天然高溫高壓下形成的立方結構碳晶體

Mineral composed essentially of carbon crystallized at extremely high temperatures and pressures. In nature, diamonds form at 150 to 200 kilometers (93 to 124 miles) or more below the earth's surface. Diamond is the hardest of all known natural substances, and forms in the cubic, or isometric, crystal system. It ranges from colorless to a wide variety of colors. Poorly colored or heavily included single crystals are used for industrial purposes.



1871, Kimberley, South Africa

De Beers

Oppenheimer



Kimberlite

Old South Africa diamond mine



Modern Canadian diamond mine

2003 World Rough Diamond Production						
Rapaport Estimates						
Rank	Country	\$ million	Market Share by Value	Carat (million)	Market Share by Carat	Avg. \$/ct
1	Botswana	\$2,500	27.1%	30.2	19.5%	\$83
2	Russia	\$1,650	17.9%	35.0	21.3%	\$50
3	Canada	\$1,200	13.0%	11.2	7.2%	\$107
4	South Africa	\$1,100	11.9%	12.7	8.2%	\$87
5	Angola	\$900	9.7%	5.7	3.7%	\$158
6	Democratic Republic of Congo	\$630	6.8%	26.0	16.8%	\$24
7	Russia	\$450	4.9%	20.9	20.0%	\$22
8	Kenya	\$430	4.6%	1.5	0.9%	\$288
9	Ukraine	\$75	0.8%	0.4	0.3%	\$188
10	South America	\$70	0.8%	0.8	0.5%	\$92
11	Sierra Leone	\$70	0.8%	0.3	0.2%	\$238
12	Central African Republic	\$55	0.6%	0.4	0.2%	\$137
13	Ghana	\$23	0.2%	1.0	0.6%	\$23
14	Tanzania	\$20	0.2%	0.2	0.1%	\$100
15	China	\$15	0.2%	0.2	0.1%	\$100
16	Other	\$30	0.3%	0.3	0.2%	\$60
TOTAL		\$9,340		135		

Traceability of Originality

Certificate of Origin

Certificate of Authenticity

Rough diamonds received at cutting



The Diamond Trading Company (DTC)
A De Beers Group Company



A Diamond is Forever
DTC Forever Mark



De Beers – Diamond Trading Company DTC

Chaterhouse, Holborn, London



De Beers – Diamond Trading Company DTC



Chaterhouse, Holborn, London

Diamond trading market



DTC Forever Mark
Certificate of Authenticity

鑽石恆久遠，
一顆永留傳

A Diamond is Forever



Certificate of Authenticity

De Beers-Oppenhheimer



Canadian Diamonds
Certificate of Authenticity



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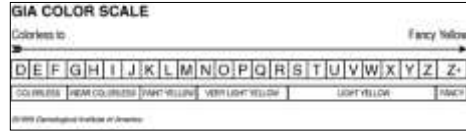
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Table 1 - Color Grading Scale	Table 2 - Color Grading Scale
Colorless to Fancy Yellow	Colorless to Fancy Yellow
D E F G H I J K L M N O P Q R S T U V W X Y Z Z+	D E F G H I J K L M N O P Q R S T U V W X Y Z Z+
Colorless Near Colorless Very Light Yellow Light Yellow Fancy	Colorless Near Colorless Very Light Yellow Light Yellow Fancy

Diamond Colour

GIA D-Z Color Grading Scale



ISO 17034:
Ref Material Producer



Specific Requirements	Applicable Product or Material	Scope of Accreditation	Key Requirements
Stage 1 - Initial Assessment	Reference Material	Reference Material	Initial Assessment
Stage 2 - Final Assessment	Reference Material	Reference Material	Final Assessment
Stage 3 - Surveillance	Reference Material	Reference Material	Surveillance
Stage 4 - Re-assessment	Reference Material	Reference Material	Re-assessment



Specific Requirements	Applicable Product or Material	Scope of Accreditation	Key Requirements
Stage 1 - Initial Assessment	Reference Material	Reference Material	Initial Assessment
Stage 2 - Final Assessment	Reference Material	Reference Material	Final Assessment
Stage 3 - Surveillance	Reference Material	Reference Material	Surveillance
Stage 4 - Re-assessment	Reference Material	Reference Material	Re-assessment





製定鑽石切割分析儀的校正



Natural Diamond 天然鑽石

Clarity Treated Diamond 淨澈度改造鑽石
Laser drilled or Fracture filled

Colour Treated Diamond 顏色改造鑽石
Irradiation or HPHT treated

Synthetic Diamond 人造鑽石-CVD

Diamond Simulant 鑽石仿製品

Diamond Testing and Grading Standard Method

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Natural Diamond 天然鑽石 Major Physical Property of Diamond

Major Physical Properties of Diamond:

Crystal Habit:	Natural, natural occurring essentially of carbon crystallized in the hexagonal (rhombohedral) crystal system
Common Colors:	Colorless, Yellow, Brown, Blue, Black, Pink, Grey, Green, Red, Orange, Purple, White
Mohs' Hardness:	10
Specific Gravity:	3.52
Refractive Index:	2.42
Dispersion/Fluorescence:	Very Strong, Strong, Medium, Faint, None

Note: The following should be noted concerning the use of the word "diamond":

- The use of the word "diamond" alone implies that the diamond is natural.
- The word "diamond" alone shall not be used to describe synthetic diamonds no matter which basic materials or methods are used. Products made in this way shall be referred to clearly as "synthetic diamond" and shall not be graded.

The 4 "C" Grading of Diamond

Carat



Colour

Cut

Clarity

Authentic identification The 4 "C" + 1"C" + 1"F" Grading of Diamond

Carat



Colour

Cut
(proportion)

Clarity

Cut Grade GIA

Fluorescence

周生生兩鑽石滙評「虛假標注」

發言人稱檢驗標準有異

【本報專訊】周生生珠寶金器有限公司（周生生）日前在多個零售點，向顧客展示兩款鑽石，其中一款鑽石，被指為「虛假標注」。周生生發言人表示，該款鑽石，並非周生生所售，且其檢驗標準與周生生不同。發言人指出，該款鑽石的切工、顏色、淨度及重量，均與周生生所售鑽石不同。此外，該款鑽石的切工，亦與周生生所售鑽石不同。發言人呼籲消費者，在購買鑽石時，應認準周生生商標，並索取周生生鑽石證書，以作保障。

周生生珠寶金器有限公司發言人表示，該款鑽石，並非周生生所售，且其檢驗標準與周生生不同。發言人指出，該款鑽石的切工、顏色、淨度及重量，均與周生生所售鑽石不同。此外，該款鑽石的切工，亦與周生生所售鑽石不同。發言人呼籲消費者，在購買鑽石時，應認準周生生商標，並索取周生生鑽石證書，以作保障。



「虛假標注」

發言人稱檢驗標準有異

【伊國專訊】瑞士的士丹利珠寶有限公司，在瑞士珠寶商會「國際鑽石商會」的會議中，與會者對該公司最近公佈的「國際鑽石商會」的檢驗標準，與瑞士珠寶商會最近公佈的「國際鑽石商會」的檢驗標準，有異之處，在在可見。該公司發言人表示，該公司最近公佈的「國際鑽石商會」的檢驗標準，與瑞士珠寶商會最近公佈的「國際鑽石商會」的檢驗標準，有異之處，在在可見。

Standard Test Method 1 Authenticity Identification of Diamond

DiamondSure Method

1.4.1 Reference natural diamond (RND): A natural Type II diamond of known size and shape, used to compare with a diamond believed to be Type II.

1.4.2 Reference synthetic moissanite diamond (RSD): A synthetic diamond of known size and shape, used to compare with a diamond believed to be Type II.

1.4.3 Reference synthetic natural diamond (RND): A natural Type II diamond of known size and shape, used to compare with a diamond believed to be Type II.

1.4.4 Reference synthetic moissanite diamond (RSD): A synthetic diamond of known size and shape, used to compare with a diamond believed to be Type II.

Diamond Sure- Detection of Natural vs Synthetic Diamond

Use visible absorption spectrum
Verify Type II diamonds
Identify all synthetics, heat treated
Determine synthetic moissanite



Cubic Zirconia (CZ)



Moissanite



Synthetic Diamond Chemical Vapour Deposition (CVD)



Diamond View – Detection of Type II Diamond

Produce a fluorescence image
Expose to shortwave UV light
High temp grown synthetic diamond differ greatly from natural diamond
Detect whether Type II diamond to near colourless synthetic



High Pressure High Temperature HPHT Diamond



HRD Antwerp World Diamond Centre D-Screen - Detection of Natural Diamond

Green – no synthetic or color enhanced
Orange – further test in a laboratory



Optical transmission through Polished stone at deep UV ray

Hoge Raad voor Diamant or the Diamond High Council

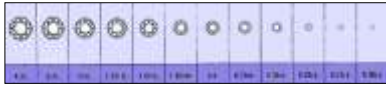
Standard Test Method 2 Weight Measurement of Diamond

Diamond Carat

Carat: The weight of a diamond shall be expressed in metric carats, one carat being equivalent to 200mg (1/5g).

The weight of a diamond shall be stated in carats to two decimal places and shall be rounded upwards if the third decimal is ≥ 0 , for example:

- 0.295 → 0.30 ct.
- 0.998 → 1.00 ct.
- 0.990 → 1.00 ct.



Standard Test Method 3 Colour Grading of Diamond

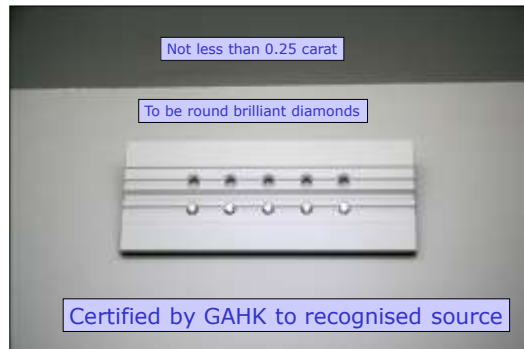
Diamond Colour

GIA D-Z Color Grading Scale

GIA COLOR SCALE																						
Colorless to											Fancy Yellow											
D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z
COLORLESS			NEAR COLORLESS			FANTY YELLOW			VERY LIGHT YELLOW			LIGHT YELLOW			FANCY							



1st or 2nd Generation Colour Master



GIA	CIBJO/EC					Gem B.V.
	English	Dutch	French	Italian		
10	Exceptional color	0	Exceptional color	0	Exceptional color	0
9	Very good color	1	Very good color	1	Very good color	1
8	Good color	2	Good color	2	Good color	2
7	Fair color	3	Fair color	3	Fair color	3
6	Fair color	4	Fair color	4	Fair color	4
5	Fair color	5	Fair color	5	Fair color	5
4	Fair color	6	Fair color	6	Fair color	6
3	Fair color	7	Fair color	7	Fair color	7
2	Fair color	8	Fair color	8	Fair color	8
1	Fair color	9	Fair color	9	Fair color	9
0	Fair color	10	Fair color	10	Fair color	10
11	Fair color	11	Fair color	11	Fair color	11
12	Fair color	12	Fair color	12	Fair color	12
13	Fair color	13	Fair color	13	Fair color	13
14	Fair color	14	Fair color	14	Fair color	14
15	Fair color	15	Fair color	15	Fair color	15
16	Fair color	16	Fair color	16	Fair color	16
17	Fair color	17	Fair color	17	Fair color	17
18	Fair color	18	Fair color	18	Fair color	18
19	Fair color	19	Fair color	19	Fair color	19
20	Fair color	20	Fair color	20	Fair color	20
21	Fair color	21	Fair color	21	Fair color	21
22	Fair color	22	Fair color	22	Fair color	22
23	Fair color	23	Fair color	23	Fair color	23
24	Fair color	24	Fair color	24	Fair color	24

Table 1 - Corresponding Grades for Colour Grades



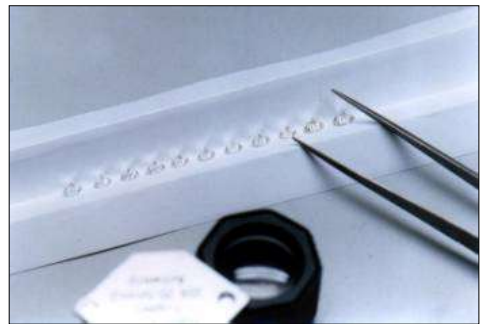
Cubic Zirconia (CZ)



GIA Colour Master



鑽石比色石國家標準樣品





Natural Fancy Yellows

We stock Natural Fancy Colored Diamonds graded by the GIA, in sizes ranging from .50 carats to stones larger than 20.00 carats. Many of our diamonds have already been beautifully mounted to ensure your success for making the sale.

- Fancy Light Yellow
- Fancy Yellow
- Fancy Intense Yellow
- Fancy Vivid Yellow



Matched Pairs Available



**Standard Test Method 4
Fluorescence of Diamond**

3. An artificial UV light source. The specifications of an artificial UV light source shall be a less than UV lamp (approximately 333 nm).



1. Fluorescence reference stones: The reference stones shall be not smaller than 0.25 ct and shall not have inclusions characteristic that are eye visible under normal vision. They shall have a blue fluorescence. Each shall be a least "8000". The stones shall be round. All stones in a set shall be of similar weight and proportions (deviation within 1%), and the sizes of the girdles shall be the same. The reference stones shall be certified by GIA, or a laboratory recognized source.

Fluorescence Reference Master Stones



2. Two reference stones, showing a combination of the intensities "none", "faint", "medium", and "strong" shall be required to analyze the consumer fluorescence description for each diamond. The reference stones and the diamond under examination shall be positioned on a matt black or white background with an International.

**Standard Test Method 6
Clarity of Diamond**

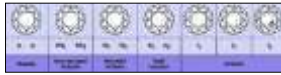
Diamond Clarity (GIA or CIBJO)

CIBJO	GIA	VVS VS SI I1 I2
EC	IF	
	IF	
VVS1	VVS1	
VVS2	VVS2	
VS1	VS1	
VS2	VS2	
SI1	SI1	
SI2	SI2	
I1	I1	
I2	I2	
I3	I3	

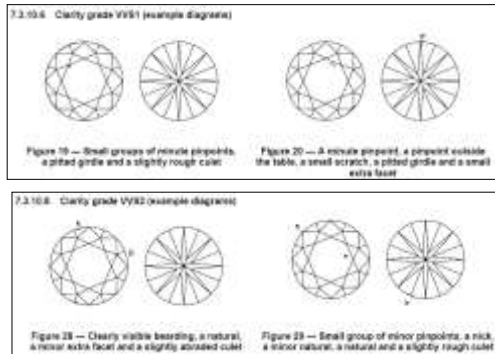
Note: The grades shaded in grey may be used by diamonds meeting state 1, 2 or 3.

Table A-1 Clarity grades

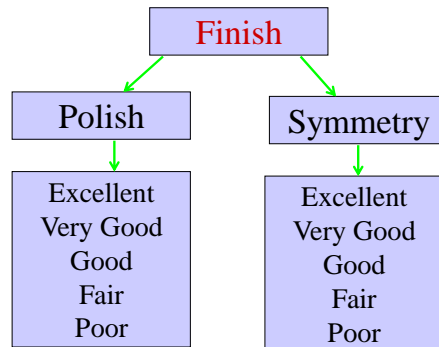
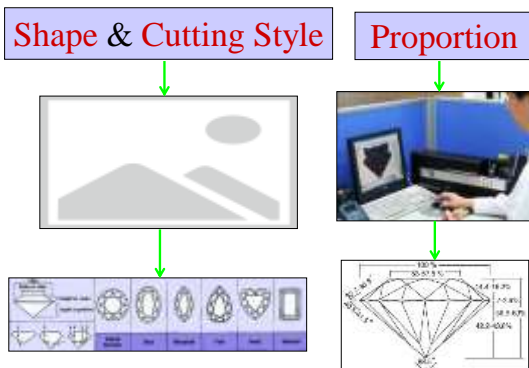
INTERNAL CHARACTERISTICS	EXTERNAL CHARACTERISTICS
Brilliance	Brilliance
Clarity	Clarity
Color	Color
Cut	Cut
Fluorescence	Fluorescence
Weight	Weight
Shape	Shape
Finish	Finish
Proportion	Proportion
Table	Table
Depth	Depth
Heights	Heights
Widths	Widths
Angles	Angles
Distances	Distances
Other	Other



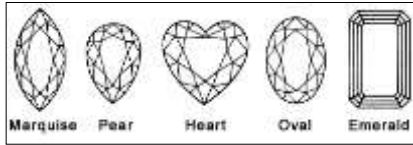
改進的Clarity分類標準



Standard Test Method 6 Shape & Cutting Style, Proportion and Finish of Diamond



Fancy Shapes
 Any shape other than round is referred to as a fancy
 There are many popular fancy shapes, including those shown below.



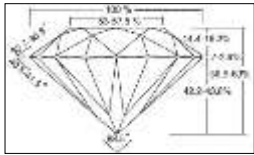
Standard Test Method 7
 Cut Grading of Round Brilliant Diamond

GIA Cut Grade Criteria

GIA Facetware Cut Estimator Programme

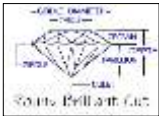


Modern Ideal Cut proportions



Round Brilliant Shape

Cut with 58 facets, counting the culet and table with brilliant and/or ideal cuts and angles.
 More engagement rings are sold with round brilliant shape diamonds than any other.

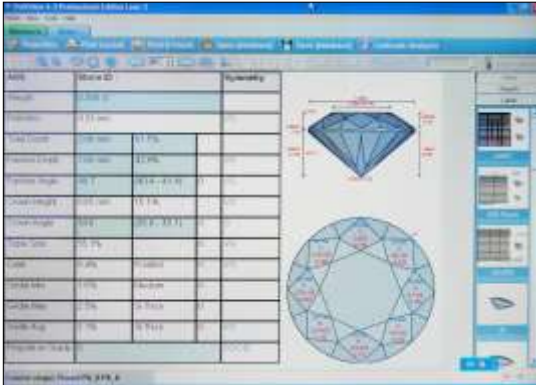


Method 1 Appearance-Based Cut

Method 2 Proportion-Based Cut

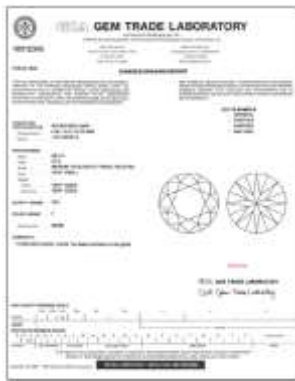


4.1.50000
 This is a standard diamond. The table is 100% of the diameter of the diamond. The crown angle is 56-58% of the diameter of the diamond. The pavilion angle is 42.5-43.5% of the diameter of the diamond. The culet is 0.5-0.6% of the diameter of the diamond.



Diamond Grading Report

鑽石評級報告



GIA



GIA



GIA



Gemological Institute of America

GIA



Gemmological Association of Great Britain



National Gemstone Testing Centre
中国国家珠宝玉石质量监督检验中心



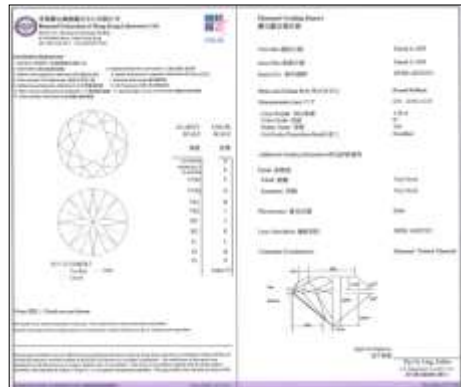
National Gemstone Testing Centre
中国国家珠宝玉石质量监督检验中心

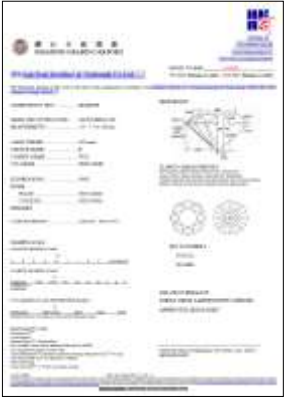
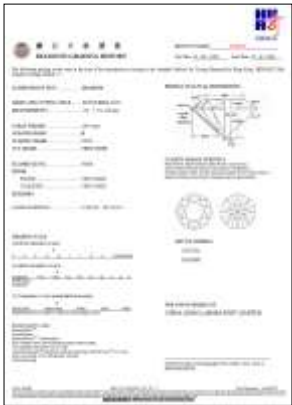


Mounted Diamond Grading Certificate



Mounted Diamond Grading Certificate





Special Diamonds

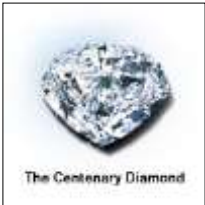
與眾不同的鑽石

The Hope Diamond 希望鑽石

- Features:
- 45.52 carats
 - VS1 Clarity Grade
 - Fancy Deep grayish blue
 - Believed to have been fashioned from the 67.50 carat (old carats) French Blue Diamond
 - Named for Henry Philip Hope, who purchased it in 1830
 - Housed in the Smithsonian Institution
 - Graded by GIA in 1997



The Centenary Diamond 百周年鑽石



- Features:
- 273.85 carats
 - The Centenary was so named in honor of DeBeers' 100th Anniversary
 - Largest "D" color, flawless or IF diamond graded by GIA to date
 - Graded by GIA in 1994

Colour "D"

50卡頂級鑽
賣2700萬

紐約蘇富比拍賣行展出今年春季拍賣的一系列珍貴寶鑽，這些鑽上鑽石總包達到頂級D級的50.52卡鑽石的區域，預計可以拍賣到超過二千七百萬美元。(美聯社)



50.53 carats

HK\$ 27 million



一睹三千萬元全美鑽石

【本報紐約訊】蘇富比拍賣行昨日在紐約展出今年春季拍賣的一系列珍貴寶鑽，這些鑽上鑽石總包達到頂級D級的50.52卡鑽石的區域，預計可以拍賣到超過二千七百萬美元。(美聯社)

55.95 carats

HK\$ 30 million

103.83 carats



HK\$ 78 million

稀世巨鑽 蘇富比昨日展示一顆重103.83卡的全美枕形鑽石，於本月20日在瑞士日內瓦拍賣，估價約1,000萬美元(約7,800萬港元)。(美聯社)

Diamond Simulants

鑽石代替(仿製)品



XILION - THE NEW GENERATION OF BRILLIANCE

The perfect cut of the XILION crystals makes them shine as mysteriously as the stars and sets new standards in terms of brilliance, lending your collection added value and a magical starlight aura!



SWAROVSKI

斯華樂斯基玻璃水晶

Cubic Zirconia (CZ) 立方晶体告石

Cubic zirconia is used to imitate diamond
It can be detected by testing the heat conductivity



Moissanite 碳化硅(美神萊)寶石



Silicon Carbide 合成碳硅石
 Not a "simulated" diamond or a diamond substitute
 Discovered by Nobel Prize-winner Dr Henri Moissan



Moissanite 美神萊寶石

Designed by Malossi Created Gems, Italy. Affectionately named 'Barbara', this is the largest Moissanite ring in the world. This fashionable Italian design is crafted of 1.1 oz of 18kt white gold, features a rare 8.5 mm grey Moissanite center jewel surrounded by 420 2.0 and 2.25 mm round Moissanite jewels. The diamond equivalent weight of this piece is 20.25 carats!



Moissanite 美神萊寶石

Designed by Moissanite Essence of Los Angeles, CA
 The Ultimate Eternity band, a totally flexible band of bombe' form set with five rows of round Charles & Colvard created moissanite jewels weighing approximately 8 ct. This ring is available in 14k yellow or white gold.

Comparison Chart	BEAUTY			DURABILITY		SPECIFIC GRAVITY
	BRILLIANCE Refractive Index	FIRE Dispersion	LUSTER	HARDNESS Mohs	TOUGHNESS	
	2.65-2.69	0.104	20.4%	9.25	excellent	3.21
	2.42	0.044	17.2%	10	excellent *	3.52
	1.77	0.018	7.4%	9	excellent ***	4.00
	1.77	0.018	7.4%	9	excellent ***	4.00
	1.58	0.014	4.8%	7.5	good to poor	2.72

* except good in cleavage direction ** except twinned stones

Future Developments 未來發展

ISO Internationalisation of Feicui Testing
 翡翠ISO標準-把中國翡翠產品打入國際市場
 Updated Diamond HK Standard to ISO
 ISO 鑽石標準 for HK

ISO-GAHK Certified Gemmologist
 Gemstone standard Ruby, Sapphire & Emerald

The End



Thank You