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FATAL flaws

Clarity grading coloured gemstones

In the last issue we revisited Objective Diamond Clarity Grading, a system pioneered by Michael Cowing and taught in the practical diamond grading classes at the World Gem Foundation.

In this article, we look at the clarity grading of coloured gemstones, how it differs from the grading of diamonds and why the 'fatal' flaw in the system is the system itself!

GRADING SYSTEMS

One unique feature of the World Gem Foundation is that we teach four different coloured gemstone grading systems in our theoretical and practical classes. The rationale is quite simple. If a system is used in the market, we believe that our students should know how to use it. We do not promote any system over the other. We simply let them grade the same set of study stones using all four systems. It is up to them to decide which system, in their opinion, is best for them.

It is perhaps the one class I enjoy the most because it creates credible data that can be used to analyze many different areas of coloured gemstone grading. The most important being grading consistency. In the colour grading segment, students are grouped in pairs and asked to grade 50 glass colour samples. The next day, they are given 15 of the same samples back and asked to regrade them. This allows us to see how consistent

they are in terms of hue, saturation and lightness (tone). The results are always very interesting. Typically groups that include women fair better since it is a known fact that women have a higher degree of colour perception.

The second part of the exercise involves grading fifteen actual gemstones for colour, clarity and cut.

A challenging part of this exercise is clarity grading. While it is fair to assume that since all diamonds form in similar growth environments, those that form with fewer inclusions should be valued higher than those that form with a higher degree of inclusions, the same is not true of coloured gemstones. Some are products of slow cooling, others are products of rapid cooling. Some will form with very few inclusions (aquamarine) while others (emerald) are rarely found without a significant number of inclusions.

To level the playing field, the Gemological Institute of America (GIA) introduced the classification of coloured gemstones into three categories:

Type 1: Includes gems that form with relatively few inclusions and have no eye-visible inclusions.

Type 2: Includes gems that typically form with some minor inclusions that may be eye-visible.

Type 3: Includes gems that form with many inclusions that are usually eye-visible.

Gemstone	Type	Gemstone	Type	Gemstone	Type
Aquamarine	1	Tanzanite (Zoisite)	1	All Sapphires	2
Green/Pink Beryl	1	Alexandrite	2	All Spinel	2
Yellow/Green Chrysoberyl	1	Andalusite	2	Bi-Colour/Blue Tourmaline	2
Kunzite	1	Golden Beryl	2	Golden Tourmaline	2
All Topaz	1	All Garnets	2	Pink Tourmaline	2
Blue-Green Tourmaline	1	Iolite	2	Brown Zircon	2
Chrome/Green Tourmaline	1	Ruby	2	Emerald	3
Ametrine/Citrine Quartz	1	Peridot	2	Red Tourmaline	3
Zircon (All Colours)	1	Amethyst Quartz	2		



Examples of Type 1 (Aquamarine), Type 2 (Blue Sapphire) and Type 3 (Emerald) Gemstones

While this acknowledges that not all coloured gemstones are created equally, it does pose problems in terms of how they are graded.

GIA / GEMEWIZARD

As we can see from the chart below, the GIA / Gemewizard clarity grading system divides gemstone by clarity type into five different clarity classifications; namely severely included, heavily included, moderately included, slightly included and eye clean.

What is not readily apparent is that the same 'visual appearance' of an inclusion will create three different grades based on the clarity type. For example, a gemstone that has 'inclusions that may be visible to the

unaided eye and are moderate to severe under 10X' will receive a clarity grade ranging from 'severely included' to 'moderately included'.

What does this mean from a grader's perspective?

Well, it forces the grader to reprogram their brain each time they clarity grade a coloured gemstone and while this may sound easy, it is not. Imagine seeing the very same inclusion but assigning three different grades dependent on whether it is a Type 1, Type 2 or Type 3 gemstone? Since consistency is the aim of every grader, having to reprogram your brain each time you grade a gemstone is never going to produce consistent results.

Type	GIA Severely Included	GIA Heavily Included	GIA Moderately Included	GIA Slightly Included	GIA Eye Clean
1	Inclusions may be visible to the unaided eye and are moderate to severe under 10X	Stone may have minor inclusions visible to the unaided eye with moderate 10X inclusions.	Stone appears clean to the unaided eye but may have minor inclusions under 10X	Stone appears clean to the unaided eye but may have minute inclusions under 10X	Stone appears clean to the unaided eye and has no inclusions under 10X
2	Prominent inclusions that have a negative effect on appearance, durability or both.	Inclusions may be visible to the unaided eye and are moderate to severe at 10X	Stone may have minor inclusions visible to the unaided eye with moderate 10X inclusions.	Stone appears clean to the unaided eye but may have moderate inclusions at 10X	Stone appears clean to the unaided eye with possible minor inclusions at 10X
3	Prominent inclusions that have a severe effect on appearance, durability or both.	Prominent inclusions that have a negative effect on appearance, durability or both.	Inclusions may be visible to the unaided eye and are moderate to severe at 10X	Stone may have minor inclusions visible to the unaided eye with moderate 10X inclusions.	Stone appears clean to the unaided eye but may have moderate inclusions at 10X

GEMDIALOGUE

GemDialogue™ require all stones to be clarity graded twice in a face-up position, firstly with the unaided eye and secondly under 10X magnification (CHART A). This makes allowances for darker stones, where the inclusions may be obscured by the colour mask, and lighter stones, where even slight inclusions may be noticeable.

GemDialogue™ also make allowances for stones that are normally, seldom or rarely eye clean in their final grading.

In the case of an 'Eye Clean' stone (CHART B) that is typically found free of inclusion (i.e., aquamarine type 1), a 'Flawless' clarity grade would add +2 to the colour score, while the same stone graded as 'I-1' would result in a 1.5 deduction.

If, on the other hand, the stone is a ruby (type 2), a 'Flawless' grading under 10X would add 2.5 to the overall score while an 'I-1' would reduce the score by 1.

The difference between GemDialogue and GIA / Gemewizard is that the actual grading criteria does not change based on the clarity type. The only time clarity type is factored in is when you adjust the score (CHART B).

So, if a gemstone is graded 'Flawless' under 10X, it does not matter if it is an aquamarine (type 1), a ruby (type 2) or an emerald (type 3). Users of GemDialogue grade the stones the way they see it without the need to reprogram their brain each time they grade a gemstone of a different clarity type.

CHART A	
Clarity Grade	Unaided Eye Description
EC	Eye Clean. No inclusions are visible to the eye.
DE	Inclusions are visible but are difficult to see with the eye.
DE-SE	If the more easily seen inclusions are not in the centre of the stone.
SE-DE	Prominent inclusions are in the centre of the stone or take up a larger area of the stone.
SE	Seen Easily. Prominent inclusions, readily seen by the eye.
Under 10X Magnification	
Flawless	No inclusions visible under 10X. Only used for unmounted stones.
VVS-1	Minute inclusions present, seen with extreme difficulty, not in the centre.
VVS-2	Same as VVS-1 but the inclusions are in the centre of the stone.
VS-1	Inclusions seen with difficulty, but are not in the centre of the stone.
VS-2	Same as VS-1 but inclusions are also seen in the centre of the stone.
SI-1	Inclusions seen easily but are not in the centre of the stone.
SI-2	Same as SI-1 but inclusions are also in the centre of the stone.
I-1	Prominent inclusions seen with difficulty with the eye but not in the centre of the stone.
I-2	Same as I-1 but inclusions may also be seen in the centre with the eye.
I-3	Prominent inclusions seen easily with the eye.
I-4	Extremely included but with cleavages that may reach the top centre of the stone.

CHART B											
EYE GRADE	LOUPE GRADE										
	FL	VVS1	VVS2	VS1	VS2	SI1	SI2	I1	I2	I3	I4
EC (A)	+2	+1.5	+1	+0.5	0	-0.5	-1	-1.5	-2	XX	XX
EC (B)	+2.5	+2	+1.5	+1	+0.5	0	-0.5	-1	-1.5	XX	XX
EC (C)	+3	+2.5	+2	+1.5	+1	+0.5	0	-0.5	-1	XX	XX

WORLD OF COLOR

In their pricing guide, Gemworld International (GemGuide), who market 'World of Color', recognize both the Gemological Institute of America (GIA) and the American Gemological Laboratories (AGL) clarity grading system.

The latter uses three components to determine the clarity grade of a coloured gemstone, namely 'inclusions', 'texture', and 'zoning', and the impact they have on the overall score.

Inclusions

Description	Code	Deduction
Free of Inclusions	FI	No Deduction
Lightly Included	LI	-0.5
Moderately Included	MI	-1.0
Heavily Included	HI	-1.5
Excessively Included	EI	-2.0

Texture

Description	Deduction
Transparent/Faint	No Deduction
Moderate	-0.5
Strong	-1.0
Prominent	-1.5

Zoning

Description	Code	Deduction
None/Slight	Z1	No Deduction
Somewhat Visible	Z2	-0.5
Prominent	Z3	-1.0

No allowances are made for clarity type. Texture refers to the effect inclusions have on the overall transparency of the gemstone while colour zoning is graded in three directions, through the table, through the girdle and at an intermediate angle (45°).

The use of the word 'texture' is somewhat confusing because our perception of texture is 'the feel' of something, not how transparent it is. Grading a gemstone for colour zoning in any direction other than through the table does a disservice to the cutter and would seem to be unfair.

COLOURWISE

As a hybrid colour grading system, ColourWise incorporates what they believe to be the best features from the existing colour grading systems while still making it compatible with the other systems and GemGuide.

Unlike GIA, ColourWise does not factor in the clarity type but does make adjustments when determining the price so as to create a 'level playing field'. This allows the grader to grade a stone based on what he/she sees regardless of the clarity type.

As we can see from the chart below, ColourWise rewards Type 2 and Type 3 stones that fall into the 'Internally Flawless' or 'Slightly Included' clarity categories (in bold). This is because an 'Internally Flawless' sapphire (Type 2) or emerald (Type 3) would be more desirable than one that is 'Moderately Included' if all other factors (colour and cut) are equal.

With ColourWise, transparency refers to the effect inclusions have on the overall transparency of the gemstone and colour zoning is only graded in a face-up position.

Inclusions

Description	Type 1	Type 2	Type 3
Internally Flawless	-	+ 0.5	+ 1.0
Slightly Included	- 0.5	-	+ 0.5
Moderately Included	- 1.0	- 0.5	-
Heavily Included - 1	- 1.5	- 1.0	- 0.5
Heavily Included - 2	- 2.0	- 1.5	- 1.0
Heavily Included - 3	- 2.5	- 2.0	- 1.5

Transparency

Transparent	-	-	-
Semi-Transparent	- 0.5	- 0.5	- 0.5
Translucent	- 1.0	- 1.0	- 1.0
Semi-Translucent	- 1.5	- 1.5	- 1.5

Colour Zoning

None/Slight	-	-	-
Somewhat Visible	- 0.5	- 0.5	- 0.5
Prominent	- 1.0	- 1.0	- 1.0

CONCLUSIONS

There are far more variables that can affect the clarity grading of a coloured gemstone compared to a colourless diamond such as depth of colour, position, and cut?

A darker stone will tend to 'hide' inclusions more than a lighter stone.

While an inclusion positioned around the girdle might be less obvious, it could affect the durability especially when it comes time to set the stone. In this case, it should have a negative effect on the value while an inclusion centrally located might not. Over the years, I have seen many inclusions that would make my heart

race if I were a setter. The cutter may have purposely positioned the inclusion so that it is less visible but by doing so, may have created a durability problem.

At the same token, unlike the majority of diamonds, coloured gemstones are notorious for being poorly cut. An inclusion positioned at the centre of a windowed stone (see below) will be more obvious than an identical inclusion in a well cut stone.

Clearly, there is no easy solution. Michael Cowing teaches us that the surface area of an inclusion, its contrast and position can be used to establish the clarity grade of a diamond. Wouldn't it be nice if the same were true for coloured gemstones!

Inclusion in a windowed tanzanite



Same inclusion in a well cut tanzanite

GT QUIZ #31

Gem Localities



How is your knowledge of geography? This time we look at famous gem localities. Travel around the world without leaving home!

Fifteen questions and no time limit!

All participants who score 100% on the first try will be entered into a draw to win our Basic Gemmology and Advanced Gemmology courses valued at \$ 675 USD.

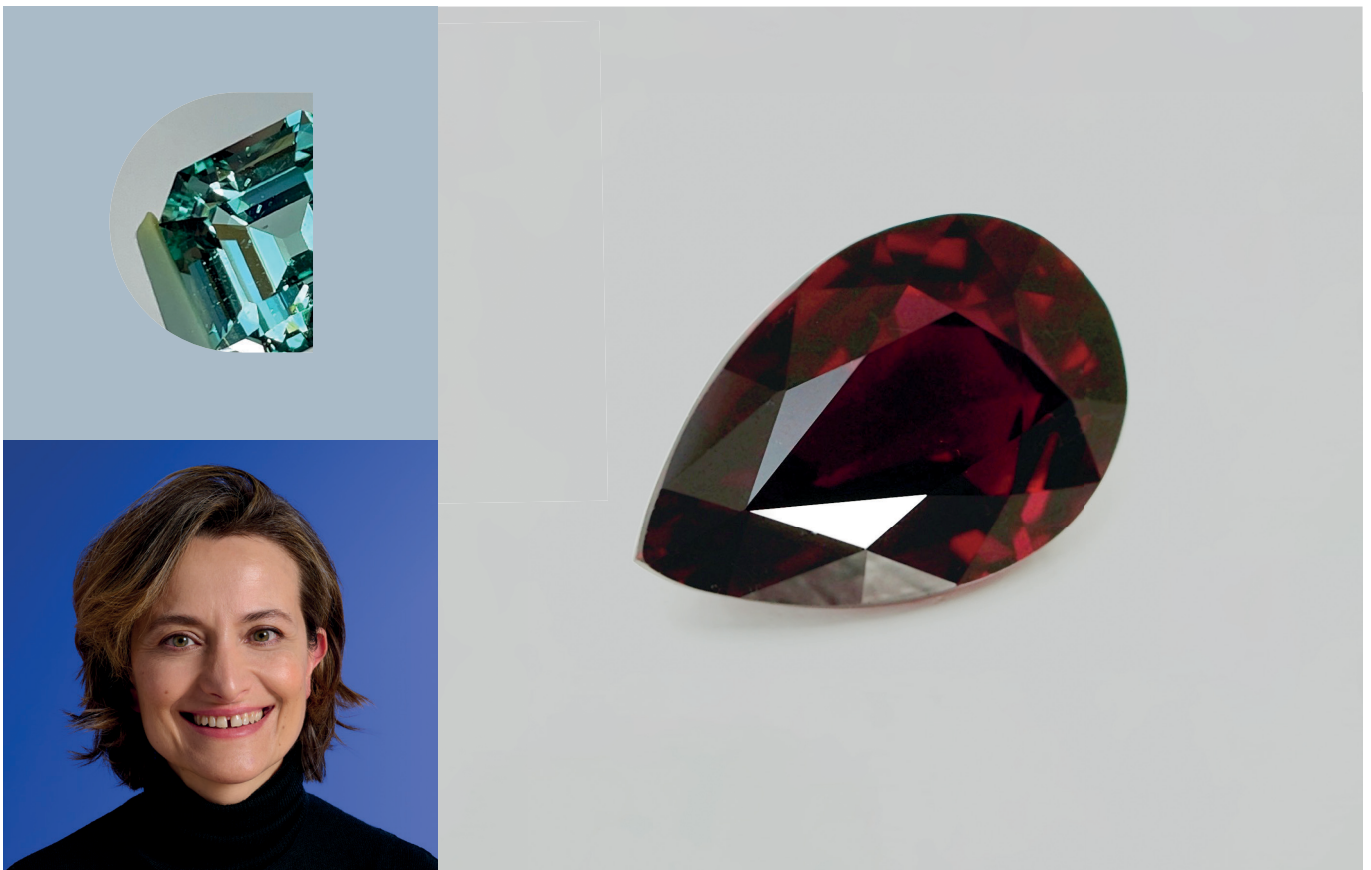
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