STANDARD TEST METHOD 7

CUT GRADING OF ROUND BRILLIANT DIAMOND

1.1 SCOPE

This Standard describes the method of cut grading of round brilliant diamond of the "colourless to yellow and brown series" in accordance with the GIA Facetware computer programme.

1.2 APPLICATION

The item submitted shall be unmounted and polished.

Prior to grading, the test item submitted shall be confirmed as being a Type Ia diamond by the Authentic Identification.

Note: Diamond other than round brilliant may be included in later versions of this standard.

1.3 DEFINITIONS

1. Appearance-Based Cut Grade: Visual assessment of a diamond's cut grade with consideration of its face-up appearance including brightness, fire, pattern, overweight, and total depth percentage.

2. Proportion-Based Cut Grade: Proportion and finish assessment of a diamond's cut grade including table percentage, star facet length percentage, crown angle, crown height percentage, girdle thickness, girdle thickness variation, pavilion depth percentage, lower girdle facet percentage, culet size, finish, and the effects of the girdle thickness variation.

The Definitions stated in the section "Terms and Definitions" or in other parts of this standard apply to this test method.

1.4 APPARATUS

The following apparatus is required:

1. Sarin (or other equivalent scanning device) installed with GIA Facetware and DiaVision: A scanning device to estimate the diamond's proportion.

2. Standardized Lighting Source:

   i. Neutral background (e.g., DiamondDock or other equivalent color-grading box)

   ii. An artificial fluorescent light source range from D55 to D65 according to the International Commission on Illumination (CIE) standard illuminant.

   iii. Light Emitting Diodes (LEDs) or spotlighting.

1.5 TEST ITEM

The cut grading of diamond is a single unit test for a whole piece of test item in its entirety. Sampling of a number of test items to represent a batch of diamond products shall not be permitted.

1.6 PROCEDURES

The Cut Grade of a diamond shall be determined either by:

Method 1)
Considering both the Appearance-Based Cut Grade and the Proportion-Based Cut Grade; the lower rating of the two determines the grade.

or;

Method 2)
Considering only the Proportion-Based Cut Grade

Whichever method is chosen shall be indicated clearly in the grading report.

The cut grade of the test diamond shall be graded by GAHK Certified Gemmologist (Diamond)

1) Estimation of the Appearance-Based Cut Grade:

a) Brightness:

1. Tilt the neutral colour tray holding the diamond to observe the diamond at different angles.
2. Visually estimate brightness under an artificial fluorescent light source and record the brightness grade according to the following guidelines:

Cut Grade – Brightness	**Observation**
Excellent (Ex)	Stone appears very lively. Bright areas are evenly distributed across the stone's crown with no distracting dark areas.

	The area directly below the table facet, especially around the culet, remains bright.
Very Good (VG)	Stone appears lively. Bright areas are evenly distributed across the stone's crown, and there are few distracting areas. The area directly below the table facet remains bright.
Good (G)	Stone has some life. Some dark areas detract from the stone's appearance. The upper girdle facets, the area under the stone's crown around the culet, or both, might be dark.
Fair (F)	Stone has little life. Some crown areas are bright, but large areas might be grey. There might be concentrated areas of darkness within the table area, around the girdle, or both.
Poor (P)	Stone appears dull and lifeless. Only small areas of the crown are bright. Table area might be very dark, and the dark area might extend beyond the table into the surrounding crown facets. Upper girdle facets might be very dark and distracting.

b) Fire:

1. Tilt the neutral colour tray holding the diamond to observe the diamond at different angles.
2. Visually estimate fire under light emitting diodes or spotlighting and record the fire grade according to the following guidelines:

Cut Grade – Fire	**Observation**
Excellent (Ex)	Bright flashes of fire across most of the crown facets, so the stone appears very fiery.
Very Good (VG)	Flashes of fire across many of the crown facets, so the stone appears fiery.
Good (G)	Some flashes of fire. Stone can still be somewhat fiery.
Fair(F)	Small flashes of fire, which might be confined to small areas of the diamond's crown.
Poor (P)	Very few small flashes of fire, which might be confined to very small areas of the diamond's crown.

c) Pattern:

1. Tilt the neutral colour tray holding the diamond to observe the diamond at different angles.
2. Visually estimate pattern under both artificial fluorescent light source and light emitting diodes (or spotlighting) and record the pattern grade according to the following guidelines:

Cut Grade- Pattern	**Observation**
Excellent (Ex)	Very strong contrast between bright and dark. Stone is extremely attractive, with no distracting patterns. No pattern features to minute pattern features. Symmetrical radiating mains are permitted as long as they don't extend beyond the table facet or darken the area around the stone's culet.
Very Good (VG)	Strong contrast between bright and dark. Stone is very attractive, with minor pattern features. Symmetrical radiating mains can extend under the crown facets but the stone's culet area must remain bright. Slight dark rings at the table edge are permitted.
Good (G)	Some contrast between bright and dark. Stone can be attractive, but it has noticeable pattern features. Radiating mains can extend under the crown facets and the stone's culet might be dark. Other patterns might include moderately dark upper girdle facets that might give the

	stone's girdle a chipped appearance. Table edges might display a dark ring.
Fair (F)	Little contrast between bright and dark. Typically unattractive. Obvious pattern features. Many stones appear predominantly gray and might display fisheyes. Area under the table typically appears dark or lifeless. In some stones, dark upper girdle facets become more extreme and distracting. Prominent dark radiating mains are common.
Poor (P)	Very little contrast between bright and dark. Overall impression is one of darkness with few bright areas. Prominent pattern features distract the eye and make the diamond extremely unattractive. A very dark area under the table facet (dark centre) is common, and it might be combined with extremely dark upper girdle facets and very dark radiating mains. Stone might appear much smaller than its actual diameter because upper girdle facets are so dark/ Extreme fisheyes are also possible.

d) Overweight percentage:

1. Use a Sarin (or other equivalent scanning device) to measure the average girdle diameter.
2. Refer to the Diamond Suggested Weight Chart (Appendix 1) to find the suggested weight for a diamond of standard proportions that has the same average girdle diameter as the diamond under evaluation.
3. Calculate the Percent Overweight with the following formula

   Percent Overweight = (Suggested Weight – Actual Weight) / Suggested Weight X 100%

4. Obtain the Overweight percentage Possible Cut Grade according to the following table:

Possible Cut Grade(s)	**Percent Overweight**
Ex, VG, G, F, P	< 8 %
VG, G, F, P	8% to 16%
G, F, P	17% to 25 %
F, P	>25%
Not applicable (n/a)	Underweight

e) Total Depth Percentage:

Use a Sarin (or other equivalent scanning device) to obtain the total depth percentage and thus obtain the Possible Cut Grade: Excellent (Ex), Very Good (VG), Good (G), Fair (F) or Poor (P), according to the following range:

Possible Cut Grade(s)	**Total Depth Percentage**
P	<51%
F, P	51.0% to 52.9%
G, F, P	53.0% to 55.9%
VG, G, F, P	56.0% to 57.4%
EX, VG, G, F, P	57.5% to 63.0%
VG, G, F, P	63.1% to 64.5%
G, F, P	64.6% to 66.5%
F, P	66.6% to 70.9%
P	> 70.9%

f) Overall Appearance-Based Cut Grade:

Lastly, determine an estimated cut grade: Excellent (Ex), Very Good (VG), Good (G), Fair (F) or Poor (P), based on the diamond's overall appearance including Brightness, Fire, Pattern, overweight, and total depth, while the lowest rated grade prevails.

For a diamond over 1.0 carat, the Appearance-Based Cut Grade shall be graded by two Diamond Graders recognised by the GAHK, with at least one of them being a GAHK Certified Gemmologist (Diamond). The results of the grading shall be consistent between the two graders; otherwise the grading process shall be repeated until consistency of the grading results can be obtained.

2) Estimation of the Proportion-Based Cut Grade:

1. Place the diamond centrally into the Sarin (or other equivalent scanning device) and obtain the Possible Cut Grade for the following parameters:

a) Table Percentage

Possible Cut Grade(s)	Table Percentage
Ex, VG, G, F, P	52 % to 62 %
VG, G, F, P	50 % to 51 %, or 63 % to 66 %
G, F, P	47 % to 49 %, or 67 % to 69 %
F, P	44 % to 46 %, or 70 % to 72 %
P	< 44 % or > 72 %

b) Star Facet Length Percentage

Possible Cut Grade(s)	Star Facet Length Percentage
Ex, VG, G, F, P	45 % to 65 %
VG, G, F, P	40 % or 70 %
G, F, P	< 40 % or > 70 %

c) Crown Angle

Possible Cut Grade(s)	Crown Angle
Ex, VG, G, F, P	31.5° to 36.5°
VG, G, F, P	26.5° to 31.0°, or 37.0° to 38.5°
G, F, P	22.0° to 26.0°, or 39.0° to 40.0°
F, P	20.0° to 21.5°, or 40.5° to 41.5°
P	< 20.0° or > 41.5°

d) Crown Height Percentage

Possible Cut Grade(s)	Crown Height Percentage
Ex, VG, G, F, P	12.5 % to 17.0 %
VG, G, F, P	10.5 % to 12.0 %, or 17.5 % to 18.0 %
G, F, P	9.0 % to 10.0 %, or 18.5 % to 19.5 %
F, P	7.0 % to 8.5 %, or 20.0 % to 21.0 %
P	< 7.0 % or > 21.0 %

e) Pavilion Angle

Possible Cut Grade(s)	Pavilion Angle
Ex, VG, G, F, P	40.6° to 41.8°
VG, G, F, P	39.8° to 40.4°, or 42.0° to 42.4°
G, F, P	38.8° to 39.6°, or 42.6° to 43.0°
F, P	37.4° to 38.6°, or 43.2° to 44.0°
P	< 37.4° or > 44.0°

f) Girdle Thickness Variation

Possible Cut Grade(s)	Girdle thickness variation
Ex	THN-STK
VG	ETN-VTK
G	ETN-VTK
F	ETN-ETK
P	ETN-ETK

g) Girdle Thickness Percentage

Possible Cut Grade(s)	Girdle Thickness Percentage
Ex, VG, G, F, P	2.5 % to 4.5 %
VG, G, F, P	>4.5 % to 5.5 %
G, F, P	>5.5 % to 7.5 %
F, P	>7.5 % to 10.5 %
P	> 10.5 %

h) Lower Girdle Facet Percentage

Possible Cut Grade(s)	Lower Girdle Facet Percentage
Ex, VG, G, F, P	70 % to 85 %
VG, G, F, P	65 % or 90 %
G, F, P	< 65 % or > 90 %

i) Culet Size

Possible Cut Grade(s)	Culet Size
Ex, VG, G, F, P	None to small or very small
VG, G, F, P	Medium
G, F, P	Slightly large or large
F, P	Very large
P	Extremely large

2. Check for painting or digging out effects in the girdle.

i) Detect the degree of the effect of painting and digging out by observing the girdle variation and the face up appearance.

Painting: The thickness at the points where the upper girdle facet junctions meet the lower girdle facet junctions is greater than the girdle thickness at the points where the bezel facets meet the pavilion main facets.

Digging out: The girdle thickness at the points where the upper girdle facet junctions meet the lower girdle facet junctions is less than the girdle thickness at the points where the bezel facets meet the pavilion main facets. Digging out is the opposite of painting.

ii) Assign the Possible Cut Grade depending on the degree of the effects of painting or digging

out as below:

Possible Cut Grade(s)	Degree of Painting or Digging out (details see appendix 2)
Ex	None
VG	Moderate
G	Significant
F	Severe

3. Evaluate the diamond's polish and symmetry under 10X magnification. (For details see Standard Test Method 6: Shape & Cutting style, Proportion and Finish) and assign the Possible Cut Grade according to the following guidelines:

Possible Cut Grade(s)	Polish Range
Ex, VG, G, F, P	EX to VG
VG, G, F, P	G
G, F, P	F
P	P

Possible Cut Grade(s)	Symmetry Range
Ex, VG, G, F, P	EX to VG
VG, G, F, P	G
G, F, P	F
P	P

4. Use the GIA Facetware software to look up the overall computer Suggested Cut Grade.

5. Assign a cut grade based on the estimate of the diamond's proportion, girdle condition, finish and the GIA Facetware Suggested Cut Grade: Excellent (Ex), Very Good (VG), Good (G), Fair (F), or Poor (P). Note that the lowest-rated grade prevails.

Determine the overall cut grade:

Method 1- Based on both the Appearance-Based Cut Grade and the Proportion-Based Cut Grade:

1. Compare the results of the Proportion-Based estimate with the Appearance-Based estimate.

2. If the Proportion-Based Cut Grade differs by more than one grade from Appearance-Based Cut Grade, the stone shall be rechecked.

3. Assign a final, Overall Cut Grade: Excellent (Ex), Very Good (VG), Good (G), Fair (F), or Poor (P), under the principle that the lowest rated grade prevails.

Method 2- Cut Grade based solely on Proportion-Based estimate:

Report the result of the cut grade as obtained from the Proportion-Based estimate.

1.7 TEST REPORT

The report shall affirm that the test was carried out in accordance with this Standard. The Cut Grade should be reported as far as possible in conjunction with other test results such as, authenticity identification, weight measurement, colour, clarity, fluorescence and shape & cutting style, proportion and finish. In general, the test report shall include but not be limited to the following:

(a) Identification number of the diamond.
(b) Date of test.
(c) Standard method of cut grading of diamond, indicating whether the Appearance-Based method is considered.
(d) Reporting of the following results:
    i. Proportion-Based cut grade (In accordance with the GIA Facetware computer programme and stating the version of the programme)
    ii. Comments on the painting and digging effect (Optional)
    iii. Appearance Based cut grade (Optional)
    iv. Final Cut Grade.
(e) Name and signature of person responsible for testing.

Appendix 1 – Diamond Suggested Weight Chart

Diameter (mm)	Weight (ct.)
2.9	0.09
3.0	0.10
3.1	0.11
3.2	0.12
3.3	0.13
3.4	0.15
3.5	0.16
3.6	0.17
3.7	0.19
3.8	0.20
3.9	0.22
4.0	0.24
4.1	0.26
4.2	0.28
4.3	0.30
4.4	0.32
4.5	0.34
4.6	0.36
4.7	0.39
4.8	0.41
4.9	0.44
5.0	0.47
5.1	0.49
5.2	0.52
5.3	0.55
5.4	0.59
5.5	0.62
5.6	0.65
5.7	0.69
5.8	0.73
5.9	0.76
6.0	0.80
6.1	0.84

Diameter (mm)	Weight (ct.)
6.2	0.89
6.3	0.98
6.4	0.98
6.5	1.00
6.6	1.07
6.7	1.12
6.8	1.17
6.9	1.22
7.0	1.28
7.1	1.33
7.2	1.39
7.3	1.45
7.4	1.51
7.5	1.57
7.6	1.63
7.7	1.70
7.8	1.77
7.9	1.83
8.0	1.91
8.1	1.98
8.2	2.05
8.3	2.13
8.4	2.21
8.5	2.29
8.6	2.37
8.7	2.45
8.8	2.54
8.9	2.62
9.0	2.71
9.1	2.80
9.2	2.90
9.3	2.99
9.4	3.09

Appendix 2 –

Guidelines for detecting the degree of Painting and Digging Out - Observation on Girdle thickness

Possible Best Cut Grade(s)	**Painting or Digging out**	**Observation on Girdle thickness**
Ex	None	No or with barely visible painting or digging out.
VG	Moderate	If the girdle thickness variations at the hill position are not too extreme, the diamond face-up appearance probably would not be significantly affected. Diamonds with moderate painting or digging out can still be rated Very Good at best.
G	Significant	If there is a wide range in girdle thickness at the hills, the painting or digging out might significantly affect the diamond face-up appearance, especially its brightness and pattern. It can be checked by examining the two adjacent hill positions. If they have merged into one larger scallop instead of two clear hills, the level of paining or digging out is significant. This will have a negative effect on the diamond's face-up appearance. Diamonds with noticeable painting or digging out can be rated Good at best.
F	Severe	If there is an obvious wide range in girdle thickness at the hills, the painting or digging out might severely affect the diamond face-up appearance, especially its brightness and pattern. It can be checked by examining the two adjacent hill positions. If they have merged into one obvious larger scallop instead of two clear hills, the level of paining or digging out is severe. This will have a negative effect on the diamond's face-up appearance. Diamonds with obvious painting or digging out can be rated Fair at best.

Guidelines for detecting the degree of Painting and Digging Out – Observation on Face up appearance

Possible Best Cut Grade(s)	**Painting or Digging out**	**Observation on Face up appearance**
Ex	None	No or with barely visible painting or digging out.
VG	Moderate	Diamonds with significant painting only on the crown appear less bright than diamonds without painting. Fire often stands out strongly against a dark background. A pattern of dark radiating mains extending under the crown. If the centre of the stone is bright and the pattern not too distracting, a stone with slight to moderate painting on the crown can still be rated Very Good at best.
G	Significant	Diamonds' painting only on the pavilion have broad bright and dark areas that radiate out from the centres. Painting the pavilion might produce a stronger visual effect than painting the crown. Good is the best possible rating. Digging out only on the crown tends to reduce the distinction between adjacent upper girdle facets and makes them darker. It alters the scintillation pattern and makes larger areas of the diamond flash at the same time. Diamonds' with significant digging out on the crown typically grade Good or Lower. Digging out on the pavilion might produce an interrupted pattern, an overall grey appearance and little contrast. Bezel, star, and upper girdle facets might appear mostly grey. If the stone's centre is dark, or if it displays dark radiating mains, the grade shall be Good or Lower.
F	Severe	Diamonds with painting on both crown and pavilion display more extreme effects. With broad bright and dark areas that radiate out from the centres. If painting is extreme, this pattern is very distracting and the diamond might rate Fair at best. Digging out on both crown and pavilion produces more extreme effects. The stone's centre often appears dark with a bright band at the top of the crown that bands into a dark band at the opposite table edge. There is also a bright ring-like band under star facets that gives the diamond an odd, distracting appearance. Diamond with extreme digging out on both crown and pavilion typically shall be rated Fair at best.