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भारतीय मानक ब्यूरो

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Draft Indian Standard

GRADING OF MOUNTED DIAMONDS - PART 2 – CLASSIFICATION AND TEST METHOD

Precious Metal Sectional Committee, MTD 10.	Last date of comment: 26/08/2025

Foreword

(*Formal foreword clause will be added later*)

BIS has already formulated standard IS 15766 (Part 1 & 2) for Grading of polished diamonds which is for grading of loose diamonds. However, the diamonds are largely purchased by the consumer in a condition where they are already mounted on a jewellery. It was thus felt necessary to formulate a standard specifying grading of cut and polished diamond, mounted in jewellery.

The standard is being formulated in two parts

Grading of Mounted diamonds - Part 1 - General requirements for competence of a diamond testing and grading laboratory
Grading of Mounted diamonds - Part 2 – Classification and test method

The process of grading diamonds in mounted condition is carried out after identification of its origin i.e. natural or synthetic / laboratory-grown as mentioned in Part 1 of this standard Grading, when mounted, involves analysis of quality of the diamonds on the basis of Clarity, Colour and Finish. Since the type of mounting and use of metals (white, gold, etc.) affect the appearance of diamonds in terms of colour as well as visibility of inclusions, the grading results have variance from their loose counterparts. Therefore, such limitations are to be considered while grading mounted diamonds

GRADING OF MOUNTED DIAMONDS - PART 2 – CLASSIFICATION AND TEST METHOD

1 SCOPE

This document specifies the classification and test methods for Grading of mounted diamonds (Round Brilliant Cut and Fancy Shapes) in Jewellery Articles.

This document applies to mounted, polished diamonds in the colour range from colourless to near colourless D-Z (Round Brilliant Cut and Fancy Shapes). It is not to be used for fancy-coloured diamonds, treated diamonds except for laboratory grown diamonds-post growth treatment for colour enhancement, Polki or other improper cut (Single cut) diamonds, nor for assembled stones mounted in jewellery articles.

2 REFERENCES

The standards listed in Annex A contain provisions, which through references in this text constitute provisions of this standard. At the time of publication, the editions indicated were valid. All standards are subject to revision and parties to agreements based on this standard are encouraged to investigate the possibility of applying the most recent editions of these standards.

3 TERMINOLOGY

For the purpose definition given in IS 15677 PART 1 & MTD/10/28297 (Jewellery — Consumer confidence in the diamond industry) shall apply.

4 EQUIPMENT FOR GRADING

4.1 Equipment:

The laboratory shall have the equipment required for identification and grading as mentioned in Table 1, 2 and 3 of MTD/10/28409 (Grading of Mounted diamonds - Part 1 - General requirements for competence of a diamond testing and grading laboratory).

4.2. Reference Master Colour Set and Calibration Standards

4.2.1 Colour grading on the mounted diamonds is determined by visual comparison with a series of mounted master stones (reference stones).

4.2.2 For colour grading of the mounted diamonds, master sets in split colour range from E through M, ideally in two consecutive colours (e.g. E-F, F-G, G-H, H-I, I-J, J-K, K-L, L-M, etc.) to be mounted in yellow, white and rose gold metal mountings as reference. Natural diamonds must be used to create master set. It will be responsibility of individual laboratories to create their own master sets.

4.2.3 Colour grading of mounted diamond jewellery shall be done with first generation / second generation master stone set having weight above at least 0.05 ct in cluster and at least 0.10 ct for single stone, graded in loose form for colour and then mounted as per criteria mentioned for colour grade/range in the various colour of grades and settings as mentioned below, as Mounted Master Stone set for colour grading.

Metal Type / Purity	Type of Settings
Yellow Gold:750‰, 585 ‰	Based on the majority jewellery articles received by lab.
Rose Gold: 750‰,585‰	Based on the majority jewellery articles received by lab.
White Gold: 750‰,585‰	Based on the majority jewellery articles received by lab.
Rhodium Plated Yellow Gold: 750‰, 585‰	Based on the majority jewellery articles received by lab.

4.2.4 As a minimum requirement, laboratories shall create mounted master set in the following split colour grades: E-F, G-H, I-J and K-M.

4.2.5 An example of mounted reference is given below in figure 1.

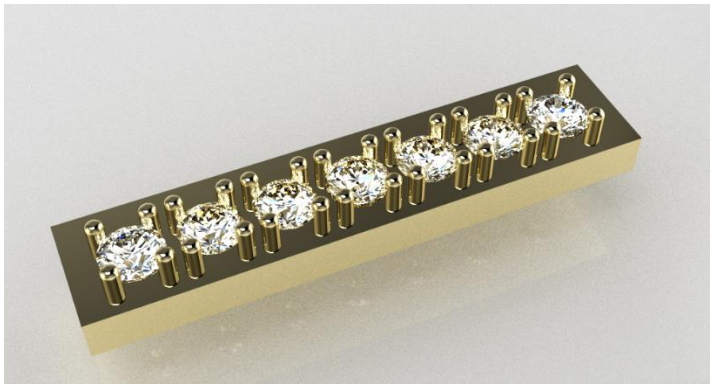

Figure 1*. Rendered sample image of the mounting style for*

4.2.6 Calibration standards to check the validity and consistency of the weighing balance should be identified and marked.

4.3 Trackability and Traceability of the Results

4.3.1 The gemmological laboratory shall have quality control procedures for monitoring the validity and reproducibility of grading results (by using a minimum of two graders or three when there is a disagreement) and internal calibration undertaken.

4.3.2. All the test performed, and observation used to arrive at the conclusion should be recorded either manually or digitally.

5 REPORTING THE RESULTS

5.1 Content of the reports: The laboratory test report shall include the following information, unless there is a valid reason for deviation or not doing so.

5.1.1 Title of the report (e.g. “Diamond Jewellery Report”).

5.1.2 The name and address of the gemmological laboratory, and the location where tests were carried out, if different from the address of the gemmological laboratory (optional).

5.1.3 Unique identification of the test report (such as the serial number), and on each page an identification to ensure that the page is recognized as a part of the test report.

5.1.4 Date of issue of report (optional)

5.1.5 A description of, the condition of, and unambiguous identification of the item(s) tested.

5.1.6 Metal type and purity may be mentioned in the report if hallmarked. The same should be mentioned on the reports under notes section, clearly mentioning the fact that metal type and purity has been declared by the depositor.

5.1.7 Testing of metal type and purity does not come into the purview of these guidelines. However, if laboratories test and mention metal purity in the reports, they must refer to the standards on testing of metal purity as per BIS.

5.1.8 Gross or item weight of the jewellery shall be mentioned in the report in grams (gm) up to two decimal points. *Refer Clause C.2.*

5.1.9 Net weight (in carat or ct) of the diamonds may be mentioned as estimated weight in the report if the laboratory takes onus on itself and refer to the guidelines or standard process of estimating weight. If net weight is based on the declaration of the submitter, the report must state that the weight mentioned is as purported by the submitter or data/information supplied by customer/depositor. *Refer Clause 5.2.*

5.1.10 Diamond Count: Reporting diamond counts is optional.

5.1.11 Identification of Diamonds must be clearly mentioned on the reports as, ‘natural diamond/s’ or ‘laboratory grown diamond/s’.

5.1.12 The terms ‘laboratory grown’ or ‘laboratory created’ should not be abbreviated as ‘lab grown’ or ‘lab created’ or ‘LGD’, etc.

5.1.13 Shape and cut of tested / graded diamonds: In the case of a jewellery where multiple shapes and cuts are used, two prominent styles may be mentioned. For example, “Round Brilliant Cut” and “Fancy Cuts”. No abbreviations to be used.

5.1.14 Measurements: In most of the cases, the type of setting does not allow to take measurements of mounted diamonds, however, when possible, the approximate values may be expressed in millimeters (mm) to at least two decimal places.

5.1.15 Colour Grade/s. *Refer Clause 5.3.*

5.1.16 Clarity Grade/s. *Refer Clause 5.4.*

5.1.17 Polish & Symmetry Grade/s. *Refer Clause 5.5.*

5.1.18 Disclosure of treatments. *Refer Clause 5.6.*

5.1.19 The format of the report shall represent the correct identity of the laboratory and should not lead to misunderstanding or misuse.

5.1.20 The report should have suitable security measures, such as a hologram or embossed seal, to minimise potential for fraud.

5.1.21 'On-line' version of the report should be made available on laboratory's website for verification and prevention of potential fraud.

5.1.22 Any information listed above that is not reported to the customer shall be readily available.

5.1.23 All reports shall have actual image of the identified and graded article.

5.1.24 Jewellery articles shall have engraved/inscribed report no. as mentioned on issued test reports.

5.2 Weight

5.2.1 Gross weight of jewellery articles shall be expressed in grams and stated in gm to two decimal places. Weight may be stated to three decimal places if the accuracy of the weighing equipment is accurate to this degree.

5.2.2 Weight of diamonds shall be expressed in metric carats(ct) to two decimal places, where one carat is equivalent to200 mg (1/5g).

5.2.3 It is preferable to express shape wise weight of polished diamonds and number of pieces of diamonds. Weight equal to greater than half carat, it is preferable to express weight separately.

5.2.4 When in mounted jewellery received in lot, weight of mounted diamonds, as customer supplied information, shall be verified by weighing loose diamonds after unmounting using at least 1 pc per 500 jewellery articles received in different lots.

5.2.5 Weight shall be rounded upwards if the third decimal is a 9. Examples

- 0,996 →0,99ct
- 0,998 →0,99ct
- 0,999 →1,00ct

NOTE: Weight may be stated to three decimal places if the accuracy of the weighing equipment is accurate to this degree.

5.3 Colour Grade

5.3.1 It is the relative absence (colourlessness) or presence of yellow or brown hues in a given diamond. The colour grade shall be described by a letter range between D-Z (in capital letters),

with or without the colour corresponding terms. The grades move from D to Z with the increasing saturation of yellow or brown hues and grey tone. Refer clause 5.3.2. and Table 1 for terms used to represent colour grades.

5.3.2 Grading scales used by different international bodies are given in Table 1.

Table 1 Colour grades used by different international bodies
(*Clause 5.3.2*)

CORRESPONDING TERMS FOR COLOUR GRADES

GIA	CIBJO/IDC	SCAN.D.C.	
(1)	**(2)**	**(3)**	**(4)**
D	EXCEPTIONAL WHITE +	RIVER	**D**
E	EXCEPTIONAL WHITE	RIVER	**E**
F	RARE WHITE +	TOP WESSELTON	**F**
G	RARE WHITE	TOP WESSELTON	**G**
H	WHITE	WESSELTON	**H**
I	SLIGHTLY TINTED WHITE	TOP CRYSTAL	**I**
J	SLIGHTLY TINTED WHITE	CRYSTAL	**J**
K	TINTED WHITE	TOP CAPE	**K**
L	TINTED WHITE	CAPE	**L**
M		CAPE	**M**
N		CAPE	**N**
O		CAPE	**O**
P		CAPE	**P**
Q		CAPE	**Q**
R	TINTED	CAPE	**R**
S		CAPE	**S**
T		CAPE	**T**
U		CAPE	**U**
V		CAPE	**V**
W		CAPE	**W**
X		CAPE	**X**

Y		CAPE	**Y**
Z		CAPE	**Z**

5.3.3 Although, different systems for colour grading of diamonds are used as listed in Table 1, GIA system is the most prevalent and widely followed. Therefore, it is recommended to adopt the GIA grading system to get the uniformity in reported results. However, individual laboratories are free to use any of the internationally recognized Grading systems.

5.3.4 Any diamond with colour saturation higher than "Z" shall be described as "Fancy Colour", for which different grading systems (including scales and terms) are used by individual laboratories and are not universally acknowledged. Such diamonds are excluded from purview of these guidelines.

5.3.5 For hues other than yellow, brown and grey, irrespective of their level of saturation shall be classified under fancy colour diamonds and are excluded from purview of these guidelines.

5.3.6 Diamond colour grades are assigned as two or more adjacent spilt grades or range grades depending on the number of diamonds and their quality in a particular jewellery piece. Refer clause 5.3.7 for assigning colour grades.

5.3.7 Colour of diamonds in mounted jewellery shall be graded with the use of second-generation master stone set studded in jewellery articles as per ISO:24016 colour grading scale with following ranges of colour grades.

Colour Grade	Criteria	Colour Grade	Criteria	Colour Grade	Criteria
DE	40% & 60%	DEF	30%-40%-30%	DEFG	30%-20-40-10%
EF	40% & 60%	EFG	30%-40%-30%	EFGH	30%-20-40-10%
FG	40% & 60%	FGH	30%-40%-30%	FGHI	30%-20-40-10%
GH	40% & 60%	GHI	30%-40%-30%	GHIJ	30%-20-40-10%
HI	40% & 60%	HIJ	30%-40%-30%	HIJK	30%-20-40-10%
IJ	40% & 60%	IJK	30%-40%-30%	IJKL	30%-20-40-10%
KL	40% & 60%	JKL	30%-40%-30%	JKLM	30%-20-40-10%
MN	40% & 60%	KLM	30%-40%-30%		

LMN 30%-40%-30%

Note : 5% shall be considered as tolerance in expressed colour grades to lower colour grade /upper colour grade.

5.3.8 For mounted Star and melee size and non-certified diamonds in jewellery, only split grades of colour as mentioned above shall be expressed on report. However, for mounted diamonds weighing above 0.18 Ct in jewellery and pre-certified by competent gemmological laboratory in loose form, after verification of the issued report, single colour grade may be expressed on report.

5.3.9 In case of mounted single diamond and considering mounting limitations, split grades, such as “F-G” or “G-H” or otherwise, as applicable, should be assigned.

5.4 Clarity Grade

5.4.1 It is a relative degree of presence or absence of internal characteristics /inclusion and /or external characteristics/blemishes, with respect to the size of the diamond.

5.4.2 Clarity grades are assigned as per the system given in the Table 2

Table 2 Terms used for Clarity Grades

(*Clause 5.4.2*)

CATEGORY (1)	TERMS TO BE USED IN GRADING REPORTS (2)	EXPLANATION (3)
LC (LOUPE CLEAN)	**FLAWLESS (FL)**	FL diamonds shall be free from internal characteristics/ inclusions and external characteristics/ blemishes when examined under 10x magnification, with the exception of an inscription or laser brand that has been approved as appearing not to penetrate the surface at 10x. Finish grades (polish and Symmetry) must be Excellent. Note: The following does not disqualify a diamond from the flawless grade: • An extra facet on the pavilion which cannot be seen face up. • Naturals totally confined to the girdle, which neither thicken the girdle nor distort its outline. • Internal graining, which is not reflective, white or coloured and does not significantly affect transparency.

	INTERNALLY FLAWLESS (IF)	IF diamonds shall be free from internal characteristics/ inclusions. IF diamonds may display insignificant external characteristics/ blemishes defined as easily removable in re-polishing with a minimum weight loss at 10x magnification. Note: The following does not disqualify a diamond from the internally flawless grade: Internal graining, which is not reflective, white or coloured and does not significantly affect transparency.
VVS (Very Very Small Inclusions / Slightly Included)	**VVS1**	VVS1 diamonds shall contain minute internal characteristics/ inclusions which shall be extremely difficult to observe when examined under 10x magnification.
	VVS2	VVS2 diamonds shall contain minute internal characteristics/ inclusions which shall be very difficult to observe when examined under 10x magnification.
VS (Very Small Inclusions / Slightly Included)	**VS1**	VS1 diamonds shall contain minor internal characteristics/ inclusions which shall be difficult to observe when examined under 10x magnification.
	VS2	VS2 diamonds shall contain minor internal characteristics/ inclusions which shall be somewhat easy to observe when examined under 10x magnification.
SI (Small Inclusions / Slightly Included)	**SI1**	SI1 diamonds shall contain noticeable internal characteristics/ inclusions which shall be easy to observe when examined under 10x magnification.
	SI2	SI2 diamonds shall contain noticeable internal characteristics/ inclusions which shall be very easy to observe when examined under 10x magnification.
I or P (Included or Pique)	**I1 or P1**	I1/P1 diamonds shall contain internal characteristics/ inclusions which are prominent / obvious when examined under 10x magnification. They shall also be visible face up to the naked eye.
	I2 or P2	I2/P2 diamonds shall contain internal characteristics/ inclusions which are very prominent / obvious when examined under 10x magnification. They shall also be easily visible face up to the naked eye, slightly reducing the brilliancy of the diamond.
	I3 or P3	I3/P3 diamonds shall contain internal characteristics/ inclusions which are extremely prominent when examined under 10x magnification. They shall also be

very easily visible face up to the naked eye, reducing the brilliancy of the diamond.

5.4.3 Although, different systems for grading of diamonds are used, GIA system is the most prevalent and widely followed. Therefore, it is recommended to adopt the GIA grading system to get the uniformity. However, individual laboratories are free to use any of the internationally recognized Grading systems.

5.4.4 Diamonds that are beyond the I3/P3 grade are known as rejection grade and are considered as being outside the clarity grading scale.

5.4.5 Plotting of internal or external features is not required in mounted diamonds because of mounting limitations in a jewellery item.

5.4.6 Diamonds are assigned clarity grades after evaluation with 10X loupe and microscope (at 10x magnification). All grades to be given as two or three adjacent split grades depending on the number of diamonds and quality in a particular jewellery piece. Refer clause 5.4.7 for assigning clarity grades.

5.4.7. Clarity of diamonds in mounted jewellery shall be graded with the use of Microscope /Loupe at 10X magnification. Clarity Grades of diamonds studded in jewellery articles shall be graded as per ISO:24016 clarity grading scale. Clarity grades shall be split as per following:

Clarity Grade	Criteria	Clarity Grade	Criteria
VVS(VVS1-VVS2)	100%	VVS-VS	40%-60%
VS(VS1-VS2)	100%	VS-SI	40%-60%
SI	100%	SI-I1	40%-60%
I	100%	I1-I2	40%-60%
	100%	I2-I3	40%-60%

5.5 Polish & Symmetry Grade

5.5.1 Average Polish & Symmetry grade to be given on the overall combination of appearance (light return), polish and symmetry.

5.5.2 Appearance or light return is described by brightness, fire, and scintillation in standard lighting environment (white light - colour temperature of 6500K).

5.5.3 Polish & Symmetry grade of a diamond includes judging and assigning quality of symmetry and polish of a diamond. Polish is the quality of overall surface condition of diamond facets, while symmetry is the exactness of shape and arrangement of the facets in a diamond.

5.5.4 Assigning Polish & Symmetry grade in reports is optional, however, if laboratories report on Polish & Symmetry grade, it is recommended to report both symmetry and polish under the heading, Polish & Symmetry

5.5.5 However, laboratories have option to report symmetry and polish under separate headings.

5.5.6. Polish & Symmetry grades can vary from excellent to poor, as mentioned in Table 3.

5.5.7. Polish & Symmetry grades to be given as two or three adjacent split grades depending on the number of diamonds and quality in a particular jewellery piece. In the case of two grades evaluation, the higher grade should comprise of minimum 40% of the number of diamonds. For example, if diamonds in a jewellery are assigned finish grades VG-G, then there should be 40% or more of VG finish in a given jewellery item.

Table 3 Table describing Polish & Symmetry grades for mounted diamond
(Clause *5.5.6*)

POLISH		**SYMMETRY**	
GRADE	**EXPLANATION**	**GRADE**	**EXPLANATION**
(1)	**(2)**	**(3)**	(4)
EXCELLENT	Ranges from no polish features to a few minute features that are difficult to observe when examined under 10X magnification.	**EXCELLENT**	Ranges from no symmetry features to a few minute symmetry variations that are difficult to observe when examined under 10X magnification.
VERY GOOD	A few minor features are observed when examined under 10X magnification.	**VERY GOOD**	Minor symmetry variations are observed when examined under 10X magnification.
GOOD	Areas of noticeable features are observed when examined under 10X magnification, might affect lustre when seen by unaided eyes.	**GOOD**	Noticeable symmetry variations are observed when examined under 10X magnification, might affect overall appearance when seen by unaided eyes.
FAIR	Areas of obvious, heavy features are observed when examined under 10X magnification, affects lustre when seen by unaided eyes.	**FAIR**	Obvious symmetry variations are observed when examined under 10X magnification, often affects overall appearance when seen by unaided eyes.

POOR	Areas of prominent, heavy features are observed when examined under 10X magnification, significantly affects lustre when seen by unaided eyes.	**POOR**	Prominent symmetry variations are observed when examined under 10X magnification, significantly affects overall appearance when seen by unaided eyes.

5.5.7 Cut grade is not applicable on mounted diamonds due to mounting limitations.

5.6 Treatments

5.6.1 Presence of enhancements (treatments) and their types should be clearly mentioned in the report.

5.6.2. Table 4 overviews the treatment type, definition, their identification status and disclosure policy.

5.6.3 To avoid confusion, treatments and their types must be mentioned in clear and direct wordings, rather than using only alpha-numeric codes. The alpha-numeric codes may be used as optional, in addition to the detailed statement.

5.6.4 If a laboratory is unable to detect the presence of enhancement/treatment, such as 'HPHT', it should prominently be mentioned in the report, stating *"Due to the limitations of the mountings, Origin of the colour in Diamonds not determined.*
or similar wording conveying the message clearly.

5.6.5. When a jewellery item contains diamonds with laser drilled holes, but not filled with a glassy material, such diamond/s may be considered for grading as per the clarity grading scale (table 2). Presence of laser drill holes should be reported as per the disclosure policy mentioned in table 4.

5.6.6. When a jewellery item contains diamonds with glass filled laser drilled holes or fissures / fractures, such diamond/s shall not be considered for grading. In such cases, only 'identification report' shall be issued with the comments on presence of glass filling as per the disclosure policy mentioned in table 4.

Table 4: Types of treatments that may be applied on colourless to near-colourless diamonds (*Clause 5.6.6*)

S. No.	Treatment Type	Definition / Meaning	Identification Status		Disclosure Policy	
			With Basic Gemmological Testing	Optional Advanced Gemmological Equipment	Comments to be used in reports	Alpha-numeric code
(1)	(2)	(3)	(4)	(5)	(6)	(7)
1.	Lasering	The use of a laser and chemicals to reach and alter inclusions in diamonds. Single / number of drill holes are drilled towards a visible inclusion, leached out and cleaned. Three situations prevail currently: 1.1. Drill holes are left as they are and cleaned. 1.2. Drill holes are filled with glass of similar refractive index. 1.3. Internal laser drilling to create stress fractures around the inclusions to reach the nearest surface for	Yes. 3rd situation may be identifiable only in few cases	None	Condition 1: When laser drill holes are left without glass filling. Comments: Indications of laser drilling. Condition 2: When laser drill holes are filled with glass. Comments: Indications of clarity enhancement using laser drilling and glassy material in drill holes.	+GF

		bleaching and cleaning.				
2.	Fracture Filling (Glass-Filling)	Filling of surface breaking fractures usually with high refractive index colourless glass to improve durability and appearance.	Yes. Determination of nature of filler requires further analyses	EDXRF - to determine type of glass as filler	Indications of clarity enhancement - Minor / Moderate / Significant amount of glassy material in fractures/fissures.	Minor = F1 Moderate = F2 Significant = F3
3.	HPHT (High Pressure High Temperature)	Use of a variety of high temperature annealing techniques at different pressures to enhance optical properties such as the colour and brilliance of Type IIa diamonds. The most common change is from brown to colourless or near colourless.	No	Raman - Photo-Luminescence spectrometer, equipped with cooling system	Indications of colour modification using High Pressure High Temperature (HPHT) process.	PHT