



## DRAFT TANZANIA STANDARD

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**MMD7(411)/P1 Grading cut and polished tanzanite- terminology, classification and test methods**

For Stakeholders' comments only

**TANZANIA BUREAU OF STANDARDS**

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# Grading cut and polished tanzanite- terminology, classification and test methods

## Introduction

The aim of this standard for grading unmounted polished and cut tanzanite is to set rules for determining the weight, color, clarity and cut of individual polished and cut tanzanite with maximum precision and accuracy. On one hand, based on these four criteria - also known as "the 4C's" - the tanzanite trade evaluates the value of tanzanite. On the other hand, some tanzanite grading reports may be issued based on different standards by different laboratories, potentially leading to different results for the same tanzanite. This situation damages the reputation of the whole tanzanite trade. Hence, the need for a unique national standard for grading polished and cut tanzanite.

This document is of relevance, in particular, for the following stakeholder groups:

- jewelers of tanzanite articles,
- individuals and mining companies specially dealing with tanzanite,
- association of minerals dealers (buyers and sellers including authorized mineral brokers,
- regulators, market surveillance organizations, quality compliance organizations etc.

Others that can benefit from this document are:

- gemologists,
- policy makers,
- learning and research institutions,
- third party system and technology providers.

## 0. Foreword

This draft Tanzania Standard is being prepared by the Jewellery, Lapidary, Gemstone and Precious Metals Technical Committee (MMDC 7), under the supervision of the Mining and Minerals Standards Divisional Committee (MMDC).

In preparation of this draft Tanzania standard main assistance was drawn from the following references:

- **ISO/DIS 24016:** Jewellery and precious metals — Grading polished diamonds - Terminology, classification and test methods.
- **ISO 18323:2015:** Jewellery — Consumer confidence in the diamond industry.
- **Shamika, G.C (2009):** Tanzanite Processing Steps at Merelani Tanzania.

## 1. Scope

This standard specifies the terminology, classification and the methods that are used for the grading and description of single unmounted cut and polished tanzanite minimum 0.5 carat (ct). This standard applies to natural, unmounted, cut and polished tanzanite. It is not to be used for synthetic, laboratory grown and imitated tanzanite.

## 2. Normative reference

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

## 3. Terms and Definitions

For the purposes of this document, the following terms and definitions apply.

### 3.1. General terms

#### 3.1.1. Carat(ct)

unit of weight

**Note:** One carat being equivalent to 200 mg (0.20 g).

### **3.1.2. clarity**

relative absence or presence of internal characteristics/inclusions and external characteristics/blemishes

### **3.1.3. color**

relative absence or presence of hue, saturation and tone in standardized observation conditions

### **3.1.4. composite stone**

stone constructed of two or more parts

### **3.1.5. fluorescence**

degree of luminescence of tanzanite when viewed under a long-wave ultraviolet (UV) light source with a wavelength of 365 nm.

### **3.1.6. masterstone**

standard/reference stone

### **3.1.7. polished tanzanite**

tanzanite with defined cut

### **3.1.8. tanzanite**

rare gemstone from zoisite group that is only found from a single deposit in the world around Mirerani area, Manyara region in northern Tanzania. It has a refractive index of 1.690-1.700, specific gravity of 3.34 - 3.36 and hardness of 6-7 on the Mohs' scale

## **3.2. Terms related to internal characteristics**

### **3.2.1. bearding**

tiny feathers extending in from the girdle

### **3.2.2. bruise**

surface percussion mark, often accompanied by tiny, root-like feathers

### **3.2.3. cavity**

large or deep opening

### **3.2.4. chip**

relatively shallow indentation, usually occurring along the girdle or culet (could also be external)

### **3.2.5. cleavage**

large feather occurring in a plane, parallel to a crystal face

### **3.2.6. cloud**

hazy area made up of a number of very small inclusions

### **3.2.7. colored graining**

graining which appears as colored streaks

### **3.2.8. crystal**

mineral crystal included in a tanzanite

### **3.2.9. feather**

separation or break due to either cleavage or fracture, often feathery in appearance

### **3.2.10. fracture**

irregular breakage of the crystal

### **3.2.11. internal graining**

internal indications of irregular crystal growth

### **3.2.12. laser drilling**

burning a channel with a laser between the surface of a tanzanite and an inclusion, the channel being used as a conduit to allow a chemical treatment of the inclusion with the purpose of making the inclusion less visible

### **3.2.13. needle inclusion**

long, thin included crystal which looks like a tiny rod

### **3.2.14. reduced transparency**

cloudy, or hazy appearance of the whole or part of a tanzanite due to internal features that may or may not be visible at 10 x magnification

### **3.2.15. reflective graining**

graining which appears as reflective plane

## **3.3. Terms related to external characteristics**

### **3.3.1. abrasion**

tiny nicks along facet junction's or culet, producing white fuzzy lines instead of sharp facet edges

### **3.3.2. bruting lines**

tiny lines on a girdle not displaying a feather-like appearance

### **3.3.3. burn mark**

surface clouding caused by excessive heat, or uneven polished surface

### **3.3.4. chip**

relatively shallow indentation, usually occurring along the girdle or culet (could also be internal)

### **3.3.5. cut**

shape, proportions, polish and symmetry of a tanzanite

### **3.3.6. extra facet**

facet located without regard for symmetry and not required by the cutting style

### **3.3.7. inscription**

mark on the surface of or in a tanzanite

### **3.3.8. lizardskin**

transparent concave wave texture on the surface of a polished tanzanite, usually parallel to the direction of the cleavage surface

### **3.3.9. naked eye**

naked (unaided) eye, or visible to the eye through glasses adjusting an anomalous eyesight to normal

### **3.3.10. polish line**

tiny parallel lines left by polishing; fine parallel ridges confined to single facet, caused by crystal structure irregularities; or tiny, parallel, polished grooves produced by irregularities in the scarify surface

### **3.3.11. scratch**

linear indentation normally seen as a fine line, curved, or straight

### **3.3.12. shape/form**

outline of tanzanite when viewed perpendicular to the table facet

### **3.3.13. treatment**

any human intervention, other than the accepted practices of cutting, polishing, cleaning and setting that alters the appearance of a stone

**EXAMPLE:** Coating, fracture filling, heating, irradiation, laser drilling, HPHT treatment or any other physical or chemical process

#### 4. Identification

It shall be the responsibility of the examiner to establish that the stone under examination is tanzanite before it is graded and be aware of the possibilities of the stone being a synthetic tanzanite, a treated tanzanite, imitated tanzanite, or composite stone.

#### 5. Weight and Measurement

##### 5.1. Weight

The weight of tanzanite shall be expressed in carats (**ct**), one carat is equivalent to 200 mg (0.20 g). The weight of a tanzanite shall be stated in carats to two to three decimal places. There shall be no weight rounding upwards.

**NOTE 1** Weight may be stated to three decimal places if the accuracy of the weighing equipment is accurate to this degree of accuracy.

##### 5.2. Measurement





The measurements of tanzanite shall be expressed in millimetres to two decimal places.

#### 6. Tanzanite Classification

##### 6.1. Color

Tanzanite exist predominantly in blue color but rarely in other fancy colors. Common fancy colors include: violet, pink, brown and greenish-yellow. Color classification of tanzanite shall be as per Table 1 below

**TABLE 1 - Color grades for tanzanite**

| S/N | CODE | CLARIFICATION               | COLOR SATURATION   |
|-----|------|-----------------------------|--|
| 1   | A    | Exceptional color/Deep blue |  |
| 2   | B    | Vivid blue                  |  |
| 3   | C    | Moderate blue               |  |
| 4   | D    | Light /Pale blue            |  |

## 6.2. Clarity

Clarity classification of tanzanite shall be as per Table 2. below

**TABLE 2 - Clarity Grades for Tanzanite**

| S/N | CODE | CLARIFICATION  |
|-----|------|--|
| 1   | IF   | <ul style="list-style-type: none"> <li>• Internal Flawless Tanzanite</li> <li>• Very very slightly included</li> <li>• Can contain minute inclusion invisible to unaided eye and difficult to see under <b>10x magnification</b></li> <li>• Inclusions may be very fine needles, tiny hairline feathers, very faint clouds and percussion marks</li> </ul> |
| 2   | EC   | <ul style="list-style-type: none"> <li>• Eye Clean</li> <li>• Very slightly included</li> <li>• Contain minor inclusions which are somewhat easy to see under <b>10x magnification</b> but usually invisible to the unaided eye.</li> <li>• Inclusions may be small included crystals, liquid inclusions, fine needles, small feathers</li> </ul>          |
| 3   | SI   | <ul style="list-style-type: none"> <li>• Slightly Included</li> <li>• Contain noticeable inclusions which are apparent under <b>10x magnifications</b></li> <li>• Inclusions are included crystals, liquid inclusions, feathers, dense clouds</li> </ul>   |
| 4   | MI   | <ul style="list-style-type: none"> <li>• Moderately Included</li> <li>• Inclusion somewhat easy to see with naked eye and apparent under 10x magnification</li> <li>• Low grade stones</li> <li>• Characterized by inclusions that may have negative effect on either appearance or durability</li> </ul>  |
| 5   | HI   | <ul style="list-style-type: none"> <li>• Heavily Included</li> <li>• Inclusion easily seen by naked eye</li> <li>• Imperfect and lowest grade stones</li> <li>• Characterized by inclusions that have a negative effect on both appearance and durability</li> </ul>   |

### **6.3. Cut**

#### **6.3.1. Cut characteristics**

Cut shall be categorized by the following characteristics:

- the outline of the tanzanite combined with the facet arrangement
- proportions: the relationships between the various parts of tanzanite and the girdle diameter.
- finish: the quality of the surface condition of tanzanite, the exactness of its shape and the arrangement of the facets.

#### **6.3.2. Shape**

Common tanzanite shapes and cut are illustrated in **annex A.1**. Variety of other shapes exist and these shall be clearly described in detail.

#### **6.3.3. Proportions**

The proportions (**see Figure 2**) described in **annex A.2** shall be included in the tanzanite grading report

#### **6.3.4. Finish**

Finish includes the polish and symmetry categories. The external characteristics/blemishes shall be taken into consideration under polish or symmetry. They shall also be taken into consideration for clarity determination.

##### **6.3.4.1. Polish**

Polish refers to the quality of the facet surface condition and, shall be, graded according to the following categories:

- excellent
- very good;
- good;
- fair
- poor.

##### **6.3.4.2. Symmetry**

Symmetry refers to the exactness of the shape of tanzanite and the arrangement of the facets and shall be graded according to the following categories:

- excellent
- very good;
- good;
- fair
- poor.

## **7. Test Methods**

### **7.1. Testing weight**

Maintain and calibrate all balances used to establish the carat weight of tanzanite to ensure accuracy. Prior to weighing, all tanzanite shall be clean.

## **7.2. Testing measurements**

Use instruments accurate in millimetres to two decimal places to measure the dimensions of a tanzanite. For round stones, determine minimum and maximum diameters by making at least four measurements at differing points on the diameter of the tanzanite. Clearly establish minimum and maximum diameter measurements.

For stones other than rounds determine minimum and maximum diameters by making two measurements (or more if applicable) across the apparent length and width of the tanzanite. Clearly establish the length and width plus any other descriptive measurements.

## **7.3. Testing and grading color**

### **7.3.1. General**

Prior to color grading the following must be taken into consideration;

#### **7.3.1.1. Cleaning of masterstone**

Clean each masterstone with solvent or gemstone cleaning cloth.

#### **7.3.1.2. Masterstone for color**

Use only round brilliant-cut tanzanite for this purpose.

First generation masterstones shall be not smaller than **100 ct** and second generation masterstones shall be not smaller than **15 ct**. All stones in a set shall be of similar weight and proportions, and the nature of the girdles shall be the same.

The second generation of masterstones shall be the last generation that shall be used by laboratories for the issuing of tanzanite grading reports.

### **7.3.2. Procedures**

#### **7.3.2.1. Precautions**

Persons grading tanzanite color shall be aware of the “tiring factor” and limit the time spent grading according to their individual capabilities.

#### **7.3.2.2. Cleaning**

Clean each submitted tanzanite with tanzanite cleaning clothes prior to grading.

#### **7.3.2.3. Comparisons**

The color of tanzanite to be graded shall be determined by visual comparison with masterstones and shall be observed from the pavilion side perpendicular with the pavilion facets. Place the stone between two of the masterstones and move the stone until the correct position is found.

#### **7.3.2.4. Round Stones**

Round stones shall be examined in several directions. If different colors are observed, the predominant **A** to **D** grade shall be conclusive (**Table 1.**)

#### **7.3.2.5. Other shapes**



The color of other-shaped tanzanite shall be graded in the several directions, except the directions that points to the corners. If different colors are observed, the predominant **A** to **D** grade shall be conclusive (Table 1.)

#### **7.3.2.6. Colors**

Colors like purple and violet shall be graded as if they were within the same color series as the masterstones.

#### **7.3.2.7. Lighting**

Color grading shall be carried out under an artificial light source with a stable light output in a light intensity of approximately **600 luminance (lx)**.

**NOTE** A convenient artificial light source is a commercial tubular fluorescent lamp with color temperature of 5500 K to 6500 K.

The masterstones and the stone to be graded shall be placed with the table down on a non-fluorescent and non-reflective white background under the central area of the tube. Reflections and distractions from the environment shall be excluded. Prevent direct view of the light sources.

#### **7.3.2.8. Positioning**

Tanzanite being graded and the masterstones shall be placed directly below the light source. For an observer with normal eyesight the distance between the light source and the tanzanite being graded shall be approximately 20 cm and the light intensity at that point shall be approximately 600 lx

#### **7.3.2.9. The grade**

The color grade shall be given with one full color grade and its corresponding term in accordance with Table 1.

### **7.4. Testing and grading clarity**

#### **7.4.1. General**

Clarity grading shall be determined in accordance with **Table 2**. The practical grading for clarity shall be made with the greatest caution and shall not be made under time pressure. Experience and regular practice shall be required to achieve accurate and consistent results. Before it is graded the stone shall be properly cleaned. A thorough examination through and on each of the tanzanite's numerous facets, and along the entire girdle, shall be carried out.

#### **7.4.2. Tools/Apparatus**

The basic tool for clarity grading shall be a loupe (10x or more). Microscope may be used to 'find' internal and external characteristics.

#### **7.4.3. Procedures**

##### **7.4.3.1. General**

To determine the clarity grade of tanzanite no factors other than visibility shall be taken into account.

##### **7.4.3.2. Lighting**

Clarity grading shall always be carried out under an artificial light source with a stable light output. The light intensity at a distance of 20 cm shall be approximately 600 lx

**NOTE:** A convenient artificial light source is a commercial tubular fluorescent lamp with corrected color temperature of 5500 K to 6500 K.

#### **7.4.3.3. Distance**

Tanzanite being graded shall be held under the lamp at a distance of between 5 cm and 10 cm. Reflections and distractions from the environment shall be excluded. To determine the visibility of internal and external characteristics with the naked eye the tanzanite shall be held at a distance from the lamp of approximately 30 cm, in a position that allows light to enter through the crown, and only minimally through the pavilion

#### **7.4.3.4. Plotting**

Optionally inclusions may be plotted as the needs arise.

### **7.5. Testing and grading of finish**

#### **7.5.1. Symmetry**

When determining symmetry, the characteristics of the shape and the distribution of facets shall be taken into account, as well as extra facets and naturals. Tanzanite shall be graded in accordance with **Tables 3** below.

The observation techniques used to assign the categories listed in **Table 3** are:

- naked eye;
- 10 x magnification;
- measurements.

**TABLE 3 - Symmetry deviations**

| <b>Visibility 10 x</b>                      | <b>Grade</b> |
|---|--------------|
| No symmetry deviations                      | Excellent    |
| Negligible visible symmetry deviations      | Very good    |
| Hardly visible or minor symmetry deviations | Good         |
| Visible symmetry deviations                 | Medium       |
| Major symmetry deviations                   | Fair         |

#### **7.5.2. Polish**

When determining the polish grade the characteristics listed in **B.2** shall be taken into account and graded in accordance with **Table 4**. Combination of 10 x magnification and naked eye observations shall be used to assign the categories listed in Table 4.

**TABLE 4 - Polish characteristics**

| Visibility 10 x                                   | Grade     |
|---|-----------|
| Not found or very hard to find                    | Excellent |
| Hard to find                                      | Very good |
| Fairly hard to find                               | Good      |
| Easy to find                                      | Medium    |
| Very easy to find easily visible to the naked eye | Fair      |

**7.6. Testing and grading proportions****7.6.1. General**

Appropriate instruments (**sub clause 7.2**) shall be used to establish the measurements required to describe the proportions of tanzanite.

**7.6.2. Description****7.6.2.1. Table sizes**

The table size shall be expressed as a percentage of the girdle diameter.

**7.6.2.2. Crown height**

The crown height shall be expressed as a percentage of the girdle diameter.

**7.6.2.3. Pavilion depth**

The pavilion depth shall be expressed as a percentage of the girdle diameter.

**7.6.2.4. Girdle thickness**

The girdle thickness shall be expressed as a percentage of the girdle diameter.

**7.6.2.5. Culet size**

The culet size shall be expressed as a percentage of the girdle diameter, in accordance with **annex A.2.6**

**7.6.3. Proportions comment**

In order to maximize the beauty of the finished stone, tanzanite is cut to a particular set of proportions. Beauty is a personal impression and will vary from person to person and from time to time. Proportion parameters of round and other cut tanzanite shall be given in accordance with the refractive index which will give angles for pavilion

## 8. Tanzanite grading report

Tanzanite grading report shall contain at least the following information:

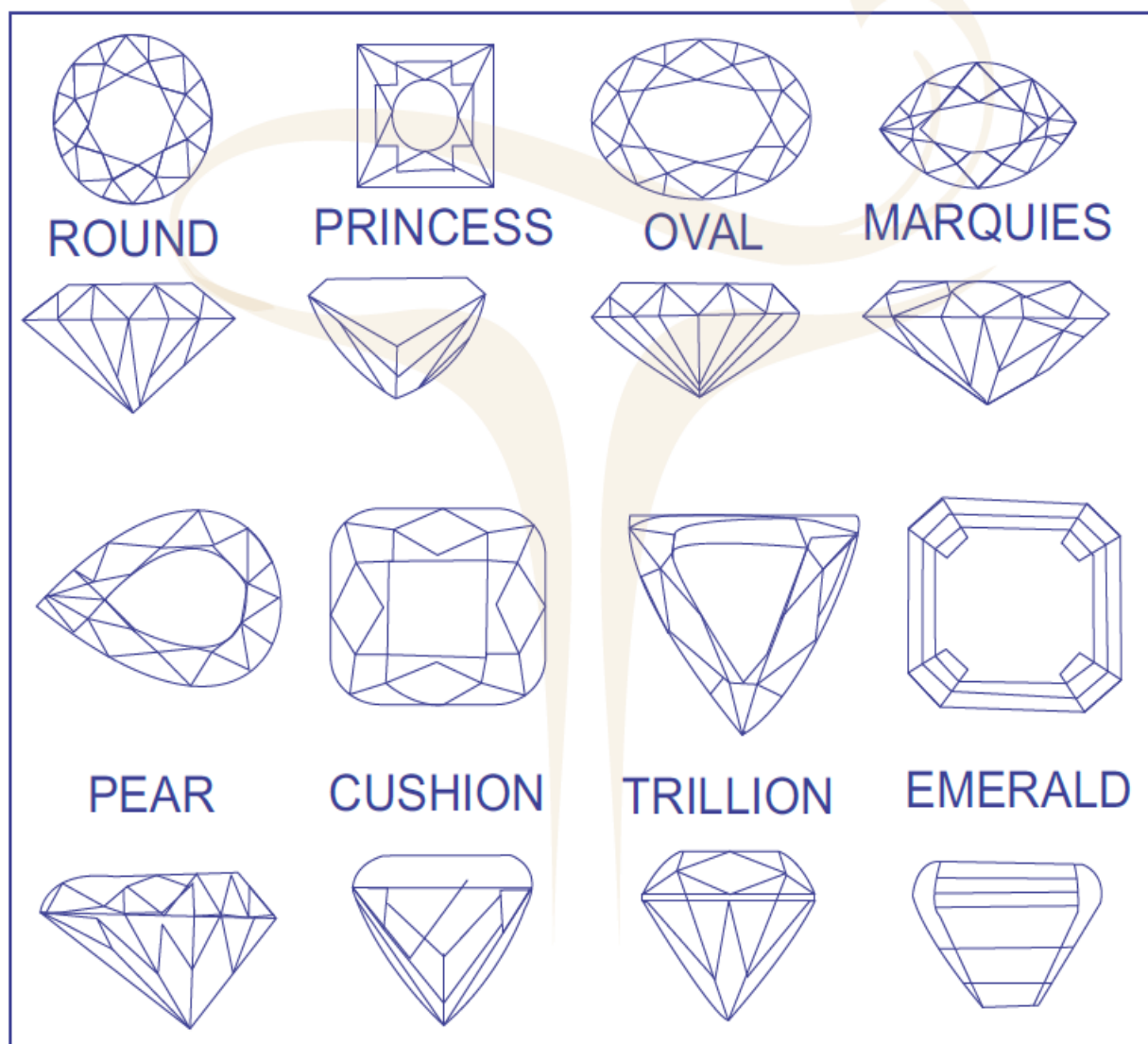
- the name and a valid address where a user can contact the institution/laboratory;
- Tanzanite grading report (as a title)
- unique tanzanite grading report reference
- the results of the following tests:
  - weight
  - colour;
  - clarity;
  - shape & cut;
  - proportions comment (only for round brilliant cuts);
  - measurements;
  - symmetry;
  - polish;
  - proportions (such as table size, total depth, crown height and/or crown angle, pavilion depth and/or pavilion angle, girdle thickness, culet size);
  - nature of the girdle (optional)
  - nature of the culet (optional)
- comments (if applicable);
- plot of internal characteristics/inclusions and external characteristics/blemishes (if applicable)
- reference to this document;
- the date and (highly recommended) the place of issue of the tanzanite grading report.

**NOTE:** A combined presentation of color and clarity may be opted in tanzanite grading report.

**Annex A**  
**(normative)**

**Tanzanite cuts and proportions description**

**A.1 Common tanzanite shapes and cuts**



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## **A.2 Description of proportions involved in the description of tanzanite**

### **A.2.1 Basis for descriptions of proportions**

For round tanzanite cut, the basis for descriptions of proportions is the average of at least four measurements at different points of the diameter of the girdle. For other shapes, this basis is the width of the tanzanite.

### **A.2.2 Table size (percentage)**

The table size shall be the average size of the table facet, expressed as a percentage of the average girdle diameter. For round stones measurements to describe the table size shall be made from opposite corner to corner and expressed as an average of the four possible measurements. For other shapes table size measurements shall be taken when viewing the profile of the tanzanite along its length

### **A.2.3 Crown height (percentage) and/or crown angle (degrees)**

For round stones; the crown height shall be the average of main measurements reflecting the distance from the upper girdle level to the level of the table facet, measured where the bezel/upper main facets and upper girdle level meet, and expressed as a percentage of the girdle diameter. The crown angle shall be the average angle formed where the bezel/upper main facets and upper girdle plane meet, expressed in degrees.

For other shapes, the crown height and angle measurements shall be taken when viewing the profile of the tanzanite along its length

### **A.2.4 Pavilion depth (percentage) and/or pavilion angle (degrees)**

For round stones; the pavilion depth shall be the average of the main measurements reflecting the distance from the lower girdle level to the level of the culet, measured where the pavilion / lower main facets meet the lower girdle level, and expressed as a percentage of the girdle diameter. The pavilion angle shall be the average angle formed where the pavilion / lower main facets and lower girdle plane meet, expressed in degrees.

For other shapes, the pavilion depth and angle measurements shall be taken when viewing the profile of the tanzanite along its length.

### **A.2.5 Girdle thickness (percentage) and description**

The thickness of the girdle shall be the average of main measurements reflecting the distance between the levels where the related lower girdle facets and upper girdle facets meet the girdle and shall be expressed as a percentage of the girdle diameter, noting the minimum and maximum and/or the average percentage. Optionally a description as "thin", "medium" or "thick" can be given instead.

For other shapes, girdle thickness measurements shall be taken when viewing the profile of the tanzanite along its length.

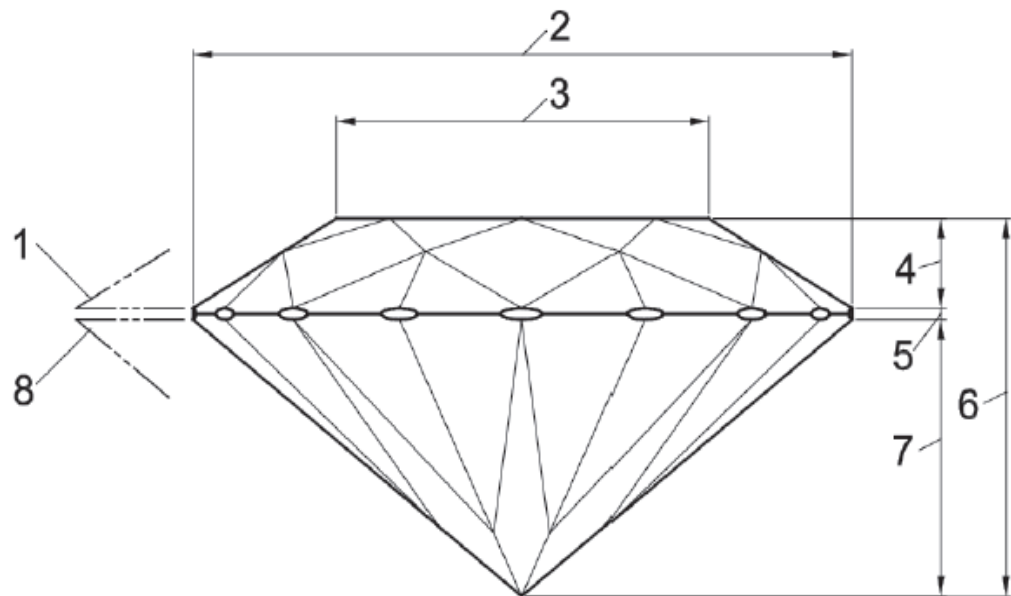
NOTE When applicable, the qualifier "partly" may be added to the girdle description

### **A.2.6 Culet size (percentage) and description**

The culet size shall be expressed as a percentage of the girdle diameter. Optionally a description as "pointed", "small", and "large" can be given instead. The culet size shall be the diameter for round stones or the culet width for other shapes. A description of the nature of the culet shall be added as "pointed", "polished", "natural", or "linear".

### **A.2.7 Total depth/height**

The total depth shall be the distance between the table facet and the culet, expressed as a percentage of the girdle diameter.



**Key**

|   |                 |   |                  |
|---|-----------------|---|------------------|
| 1 | Crown angle     | 5 | Girdle thickness |
| 2 | Girdle diameter | 6 | Total depth      |
| 3 | Table size      | 7 | Pavillion depth  |
| 4 | Crown height    | 8 | Pavillion angle  |

**FIGURE 2 - Proportions involved in the description of tanzanite**

## **Annex B**

### **(normative)**

### **Clarity, polish and symmetry characteristics**

#### **B.1 Internal and external characteristics**

Internal and external characteristics that shall be taken into consideration during clarity grading are detailed in **subclause 3.2** and **subclause 3.3** respectively.

#### **B.2 Polish determination**

The following characteristics that shall be taken into consideration for polish determination

- abrasion;
- bruting line;
- burn mark;
- nick;
- pit;
- polish line;
- pitted girdle;
- scratch

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