

# CUT GRADE

Proportions | Polish | Symmetry

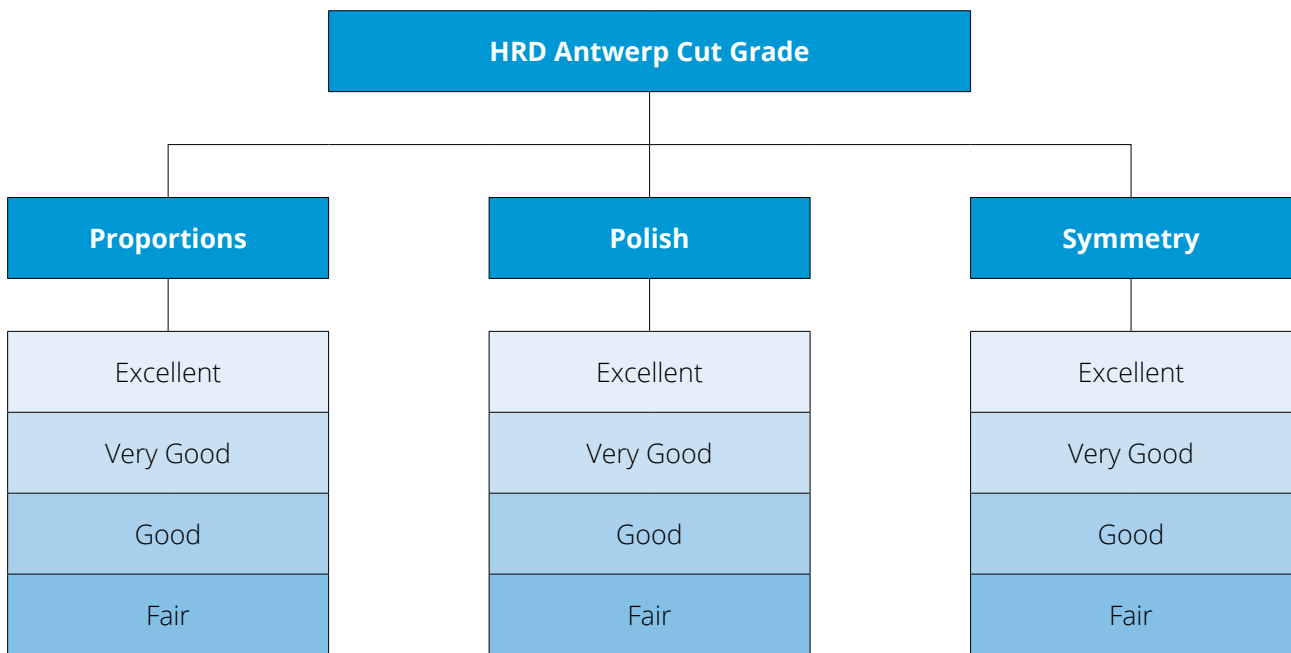
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# Definition of Cut Grade

The description of the Cut Grade on a grading report is subdivided into 3 grades: proportions, polish and symmetry. Each grade is divided into 4 categories: Excellent, Very Good, Good and Fair.

- The proportions are determinative for the brilliancy and the fire of the diamond.
- The polish describes the finish of the facets.
- The symmetry describes the variations of the different parameters which define the proportions.



# Proportions

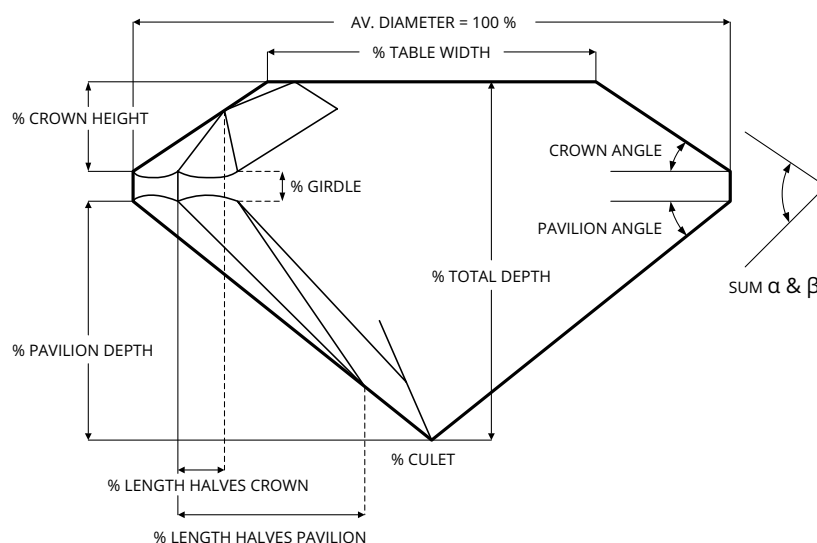
## Determination of proportions

For a diamond to show an optimal combination of brilliancy and fire, it has to be polished with due attention to the angles of inclination and proportional relations between the various parts of the stone. If the angles and proportions are not optimal, this can lead to the appearance of one or more specific effects in the stone, which are detrimental to its beauty. When grading the proportions of a polished diamond, the main issue is therefore to evaluate if, and if so to what extent, these effects occur.

## Parameters that can characterize the proportions for the round brilliant

- The crown angle ( $\beta$ )
- The pavilion angle ( $\alpha$ )
- The proportion of the table width to the diameter (% t)
- The proportion of the crown height to the diameter (% hc)
- The proportion of the pavilion depth to the diameter (% hp)
- The proportion of the girdle thickness to the diameter (% a)
- The culet size (% culet)
- The proportion of the total depth to the diameter (% td)
- The sum of the crown- and pavilion angle ( $\alpha + \beta$ )
- The half length of the upper girdle facets
- The half length of the lower girdle facets
- The fish eye effect
- The effect culet visible in the bezels

## Profile of a diamond and the different parameters



## Proportions

### Overview of the different parameters per category

	Fair	Good	Very Good	Excellent	Very Good	Good	Fair
<b>Crown angle (<math>\beta</math>)</b>	up to 25.9°	26.0 to 27.9°	28.0 to 31.9°	32.0 to 36.0°	36.1 to 37.7°	37.8 to 40.0°	40.1° and up
<b>Pavilion angle (<math>\alpha</math>)</b>	up to 38.4°	38.5 to 39.5°	39.6 to 40.5°	40.6 to 41.8°	41.9 to 42.1°	42.2 to 43.1°	43.2° and up
<b>Table width</b>	up to 49.0 %	50.0 to 51.0 %	52.0 %	53.0 to 62.0 %	63.0 to 66.0 %	67.0 to 70.0 %	71.0 % and up
<b>Crown height</b>	up to 8.5 %	9.0 to 10.5 %	11.0 to 11.5 %	12.0 to 16.0 %	16.5 to 18.0 %	18.5 to 19.5 %	20.0 % and up
<b>Pavilion depth</b>	up to 39.5 %	40.0 to 41.0 %	41.5 to 42.5 %	43.0 to 44.5 %	45.0 %	45.5 to 46.5 %	47.0 % and up
<b>Girdle</b>	up to 0.5 %	1.0 to 1.5 %	2.0 %	2.5 to 4.5 %	5.0 to 5.5 %	6.0 to 7.5 %	8.0 % and up
<b>Culet size</b>				0.0 to 0.9 %	1.0 to 1.9 %	2.0 to 3.9 %	4.0 % and up
<b>Total depth</b>	up to 52.9 %	53.0 to 55.4 %	55.5 to 58.4 %	58.5 to 63.0 %	63.1 to 64.4 %	64.5 to 66.9 %	67.0 % and up
<b>Sum <math>\alpha</math> and <math>\beta</math></b>	up to 67.9°	68.0 to 69.9°	70.0 to 72.4°	72.5 to 77.0°	77.1 to 79.4°	79.5 to 80.4°	80.5° and up
<b>Half length crown</b>	up to 30.0 %	35.0 %	40.0 %	45.0 to 55.0 %	60.0 %	65.0 %	70.0 % and up
<b>Half length pavilion</b>	up to 60.0 %	65.0 to 70.0 %	75.0 %	75.0 to 85.0 %	85.0 %	90.0 %	95.0 % and up
<b>Fish-eye effect</b>				Excellent		Good	Fair
<b>Culet in bezels</b>				Excellent		Good	Fair

If the measurement results are classified in two different categories, the lowest proportion grade is considered to be the overall reading.

### Effects that can be perceived when observing the stone perpendicular to the table

- **Fish Eye:** The reflection of the girdle is partially or completely visible in the table (small pavilion angle and a large table width).
- **Culet visible in the bezels:** The diamond shows an abnormal amount of scintillation, due to the culet and the surrounding facets being visible through the bezels (a large total depth and crown angle).

Proportions

Relation Table Width - Crown Height

		Table width (%)																				
		50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70
Crown height (%)	19.5	38.0	38.5	39.1	39.7	40.3	40.9	41.6	42.2	42.9	43.6	44.3	45.0	45.7	46.5	47.3	48.1	48.9	49.8	50.6	51.5	52.4
	19.0	37.2	37.8	38.4	39.0	39.6	40.2	40.8	41.5	42.1	42.8	43.5	44.3	45.0	45.8	46.5	47.4	48.2	49.0	49.9	50.8	51.7
	18.5	36.5	37.1	37.6	38.2	38.8	39.4	40.1	40.7	41.4	42.1	42.8	43.5	44.2	45.0	45.8	46.6	47.4	48.3	49.1	50.0	51.0
	18.0	35.8	36.3	36.9	37.5	38.0	38.7	39.3	39.9	40.6	41.3	42.0	42.7	43.5	44.2	45.0	45.8	46.6	47.5	48.4	49.3	50.2
	17.5	35.0	35.5	36.1	36.7	37.3	37.9	38.5	39.1	39.8	40.5	41.2	41.9	42.6	43.4	44.2	45.0	45.8	46.7	47.6	48.5	49.4
	17.0	34.2	34.8	35.3	35.9	36.5	37.1	37.7	38.3	39.0	39.7	40.4	41.1	41.8	42.6	43.4	44.2	45.0	45.9	46.7	47.6	48.6
	16.5	33.4	34.0	34.5	35.1	35.7	36.3	36.9	37.5	38.2	38.8	39.5	40.2	41.0	41.7	42.5	43.3	44.1	45.0	45.9	46.8	47.7
	16.0	32.6	33.1	33.7	34.2	34.8	35.4	36.0	36.7	37.3	38.0	38.7	39.4	40.1	40.9	41.6	42.4	43.3	44.1	45.0	45.9	46.8
	15.5	31.8	32.3	32.9	33.4	34.0	34.6	35.2	35.8	36.4	37.1	37.8	38.5	39.2	40.0	40.7	41.5	42.4	43.2	44.1	45.0	45.9
	15.0	31.0	31.5	32.0	32.6	33.1	33.7	34.3	34.9	35.5	36.2	36.9	37.6	38.3	39.0	39.8	40.6	41.4	42.3	43.2	44.1	45.0
	14.5	30.1	30.6	31.1	31.7	32.2	32.8	33.4	34.0	34.6	35.3	35.9	36.6	37.3	38.1	38.9	39.6	40.5	41.3	42.2	43.1	44.0
	14.0	29.2	29.7	30.3	30.8	31.3	31.9	32.5	33.1	33.7	34.3	35.0	35.7	36.4	37.1	37.9	38.7	39.5	40.3	41.2	42.1	43.0
	13.5	28.4	28.9	29.4	29.9	30.4	31.0	31.5	32.1	32.7	33.4	34.0	34.7	35.4	36.1	36.9	37.6	38.5	39.3	40.2	41.1	42.0
	13.0	27.5	28.0	28.4	29.0	29.5	30.0	30.6	31.2	31.8	32.4	33.0	33.7	34.4	35.1	35.8	36.6	37.4	38.2	39.1	40.0	40.9
	12.5	26.6	27.0	27.5	28.0	28.5	29.1	29.6	30.2	30.8	31.4	32.0	32.7	33.3	34.0	34.8	35.5	36.3	37.1	38.0	38.9	39.8
	12.0	25.6	26.1	26.6	27.1	27.6	28.1	28.6	29.2	29.7	30.3	31.0	31.6	32.3	33.0	33.7	34.4	35.2	36.0	36.9	37.7	38.7
	11.5	24.7	25.1	25.6	26.1	26.6	27.1	27.6	28.1	28.7	29.3	29.9	30.5	31.2	31.9	32.6	33.3	34.1	34.9	35.7	36.6	37.5
	11.0	23.7	24.2	24.6	25.1	25.6	26.1	26.6	27.1	27.6	28.2	28.8	29.4	30.1	30.7	31.4	32.2	32.9	33.7	34.5	35.4	36.3
	10.5	22.8	23.2	23.6	24.1	24.5	25.0	25.5	26.0	26.6	27.1	27.7	28.3	28.9	29.6	30.3	31.0	31.7	32.5	33.3	34.1	35.0
10.0	21.8	22.2	22.6	23.1	23.5	24.0	24.4	24.9	25.5	26.0	26.6	27.1	27.8	28.4	29.1	29.7	30.5	31.2	32.0	32.8	33.7	
9.5	20.8	21.2	21.6	22.0	22.4	22.9	23.4	23.8	24.3	24.9	25.4	26.0	26.6	27.2	27.8	28.5	29.2	29.9	30.7	31.5	32.3	
9.0	19.8	20.2	20.6	21.0	21.4	21.8	22.2	22.7	23.2	23.7	24.2	24.8	25.3	25.9	26.6	27.2	27.9	28.6	29.4	30.1	31.0	

Excellent
Very Good
Good
Fair

Bezel angle (°)

		Table width (%)																				
		50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70
Crown height (%)	19.5	38.0	38.5	39.1	39.7	40.3	40.9	41.6	42.2	42.9	43.6	44.3	45.0	45.7	46.5	47.3	48.1	48.9	49.8	50.6	51.5	52.4
	19.0	37.2	37.8	38.4	39.0	39.6	40.2	40.8	41.5	42.1	42.8	43.5	44.3	45.0	45.8	46.5	47.4	48.2	49.0	49.9	50.8	51.7
	18.5	36.5	37.1	37.6	38.2	38.8	39.4	40.1	40.7	41.4	42.1	42.8	43.5	44.2	45.0	45.8	46.6	47.4	48.3	49.1	50.0	51.0
	18.0	35.8	36.3	36.9	37.5	38.0	38.7	39.3	39.9	40.6	41.3	42.0	42.7	43.5	44.2	45.0	45.8	46.6	47.5	48.4	49.3	50.2
	17.5	35.0	35.5	36.1	36.7	37.3	37.9	38.5	39.1	39.8	40.5	41.2	41.9	42.6	43.4	44.2	45.0	45.8	46.7	47.6	48.5	49.4
	17.0	34.2	34.8	35.3	35.9	36.5	37.1	37.7	38.3	39.0	39.7	40.4	41.1	41.8	42.6	43.4	44.2	45.0	45.9	46.7	47.6	48.6
	16.5	33.4	34.0	34.5	35.1	35.7	36.3	36.9	37.5	38.2	38.8	39.5	40.2	41.0	41.7	42.5	43.3	44.1	45.0	45.9	46.8	47.7
	16.0	32.6	33.1	33.7	34.2	34.8	35.4	36.0	36.7	37.3	38.0	38.7	39.4	40.1	40.9	41.6	42.4	43.3	44.1	45.0	45.9	46.8
	15.5	31.8	32.3	32.9	33.4	34.0	34.6	35.2	35.8	36.4	37.1	37.8	38.5	39.2	40.0	40.7	41.5	42.4	43.2	44.1	45.0	45.9
	15.0	31.0	31.5	32.0	32.6	33.1	33.7	34.3	34.9	35.5	36.2	36.9	37.6	38.3	39.0	39.8	40.6	41.4	42.3	43.2	44.1	45.0
	14.5	30.1	30.6	31.1	31.7	32.2	32.8	33.4	34.0	34.6	35.3	35.9	36.6	37.3	38.1	38.9	39.6	40.5	41.3	42.2	43.1	44.0
	14.0	29.2	29.7	30.3	30.8	31.3	31.9	32.5	33.1	33.7	34.3	35.0	35.7	36.4	37.1	37.9	38.7	39.5	40.3	41.2	42.1	43.0
	13.5	28.4	28.9	29.4	29.9	30.4	31.0	31.5	32.1	32.7	33.4	34.0	34.7	35.4	36.1	36.9	37.6	38.5	39.3	40.2	41.1	42.0
	13.0	27.5	28.0	28.4	29.0	29.5	30.0	30.6	31.2	31.8	32.4	33.0	33.7	34.4	35.1	35.8	36.6	37.4	38.2	39.1	40.0	40.9
	12.5	26.6	27.0	27.5	28.0	28.5	29.1	29.6	30.2	30.8	31.4	32.0	32.7	33.3	34.0	34.8	35.5	36.3	37.1	38.0	38.9	39.8
	12.0	25.6	26.1	26.6	27.1	27.6	28.1	28.6	29.2	29.7	30.3	31.0	31.6	32.3	33.0	33.7	34.4	35.2	36.0	36.9	37.7	38.7
	11.5	24.7	25.1	25.6	26.1	26.6	27.1	27.6	28.1	28.7	29.3	29.9	30.5	31.2	31.9	32.6	33.3	34.1	34.9	35.7	36.6	37.5
	11.0	23.7	24.2	24.6	25.1	25.6	26.1	26.6	27.1	27.6	28.2	28.8	29.4	30.1	30.7	31.4	32.2	32.9	33.7	34.5	35.4	36.3
	10.5	22.8	23.2	23.6	24.1	24.5	25.0	25.5	26.0	26.6	27.1	27.7	28.3	28.9	29.6	30.3	31.0	31.7	32.5	33.3	34.1	35.0
10.0	21.8	22.2	22.6	23.1	23.5	24.0	24.4	24.9	25.5	26.0	26.6	27.1	27.8	28.4	29.1	29.7	30.5	31.2	32.0	32.8	33.7	
9.5	20.8	21.2	21.6	22.0	22.4	22.9	23.4	23.8	24.3	24.9	25.4	26.0	26.6	27.2	27.8	28.5	29.2	29.9	30.7	31.5	32.3	
9.0	19.8	20.2	20.6	21.0	21.4	21.8	22.2	22.7	23.2	23.7	24.2	24.8	25.3	25.9	26.6	27.2	27.9	28.6	29.4	30.1	31.0	

Excellent
Very Good
Good
Fair

Bezel angle (°)

60

Pavilion angle: minimum 40.6° maximum 41.1°

14.5

35.9

## Proportions

### Description of the girdle and influence on the proportions

Description of the girdle	Measured value	Proportion Grade
Extremely thin	0.0 – 0.5 %	Fair
Very thin	1.0 – 1.5 %	Good
Thin	2.0 %	Very Good
	2.5 %	Excellent
Medium	3.0 – 4.5 %	
	5.0 %	Very Good
Thick	5.5 %	
	6.0 %	Good
Very thick	6.5 – 7.5 %	
Extremely thick	8.0 % and up	Fair

### The influence of the culet size on the proportions

Description of the culet	Culet Size	Proportion Grade
Pointed	0.0 % (< 0.033 mm)	Excellent
	0.1 % (0.033 mm) – 0.9 %	
	1.0 – 1.9 %	Very Good
	2.0 – 3.9 %	Good
Large	4.0 % and up	Fair

### Polish

Polish defines all external characteristics of the diamond. These characteristics are mostly the result of polishing the diamond.

### The characteristics being graded

- Scratches
- Percussion figures
- Beard
- Polishing lines
- Abraded facet edges
- Pit
- Nick
- Burn marks
- Laser marks
- Extra facets
- Naturals

### Description of the polish

Polish	Observation with loupe 10x
<b>Excellent</b>	Characteristics, not or very difficult to find with a loupe 10x
<b>Very Good</b>	Characteristics, difficult to find with a loupe 10x
<b>Good</b>	Characteristics, easy to find with a loupe 10x
<b>Fair</b>	Characteristics, very easy to find with a loupe 10x

## Symmetry

### Determination of symmetry

The symmetry describes the variations of the different parameters which define the proportions.

### Measurable deviations

Symmetry-deviations	Excellent	Very Good	Good	Fair
Unroundness	< 1.0 %	< 2.0 %	< 4.0 %	4.0 % and up
Variation in crown height	< 1.0 %	< 2.0 %	< 5.0 %	5.0 % and up
Variation in pavilion depth	< 2.0 %	< 3.0 %	< 6.0 %	6.0 % and up
Table out of centre	< 1.0 %	< 2.0 %	< 5.0 %	5.0 % and up
Culet out of centre	< 1.0 %	< 2.0 %	< 5.0 %	5.0 % and up
Table and culet out of centre	< 1.0 %	< 2.0 %	< 5.0 %	5.0 % and up
Variation on the table width	< 2.0 %	< 4.0 %	< 8.0 %	8.0 % and up
Single cut effect	< 0.8 %	< 2.0 %	< 4.0 %	4.0 % and up
Deviation on the crown angles	< 2.0°	< 4.0°	< 8.0°	8.0° and up
Deviation on the pavilion angles	< 1.0°	< 2.0°	< 4.0°	4.0° and up
Deviation on the angles of the lower girdle facets	< 1.0°	< 2.0°	< 4.0°	4.0° and up

### Not measurable deviations

Visual deviations	Deviation of the bezels
	Deviation of the pavilions
	Cone-shaped girdle
	Misalignment
	Girdle partly faceted
	Bow tie effect
	Deviation on the girdle thickness (on max & min)
	Deviation on the angles of the upper girdle facets

### Information about the effects

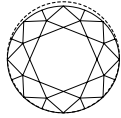

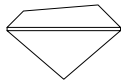
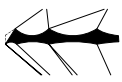
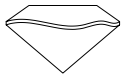
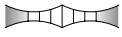
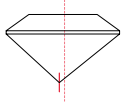
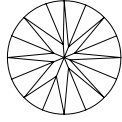
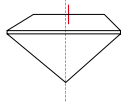
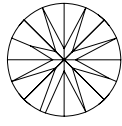
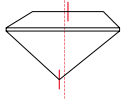




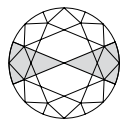

**Single Cut effect:** The diamond looks as if it has less facets than are really present. A single cut effect is caused by the angles of the bezels / pavilions and the halves of the bezels / pavilions side.

**Bow tie effect:** Through the crown side, two dark zones in the shape of a bow tie can be seen.



# Symmetry deviations

## Measurable deviations

1. Girdle outline not circular		15. Crown side not aligned to pavilion side	
2. Slanting table		16. Cone-shaped girdle	
3. Sloping girdle		17. Girdle partly faceted	
4. Culet out of centre		20. Pavilion facets not symmetrical	
5. Table out of centre		22. Pavilion facets not pointing up	
6. Table and culet out of centre in opposite direction		23. Deviation on the bezel angles	
7. Table and/or star facets not symmetrical		24. Deviation on the pavilion angles	
10. Bezels not symmetrical		25. Deviation on the angles of the upper girdle facets	
12. Crown facets not pointing up		26. Deviation on the angles of the lower girdle facets	
13. Varying girdle thickness		BOW-TIE	
14. Single cut effect (due to alternating girdle thickness)			

# Symmetry deviations

## Different symmetry deviations of the girdle

**Perfect symmetry**

variation girdle height (B & H) =  
 $\max(B\&H) - \min(B\&H) = 2.5 - 2.5 = 0\%$

variation girdle height (V) =  
 $\max(V) - \min(V) = 1 - 1 = 0\%$

variation girdle height =  $\max[\text{variation girdle height (B & H) \& variation girdle height (V)}] = 0\%$

single cut =  $\text{average (H)} - \text{average (B)} = 2.5 - 2.5 = 0\% (<0.8\%) \Rightarrow \text{Exc}$

average(H) = 2.5%  
 average(B) = 2.5%

**Single cut effect**

variation girdle height (B & H) =  
 $\max(B\&H) - \min(B\&H) = 2.7 - 2.3 = 0.4\%$

variation girdle height (V) =  
 $\max(V) - \min(V) = 1 - 1 = 0\%$

variation girdle height =  $\max[\text{variation girdle height (B & H) \& variation girdle height (V)}] = 0.4\%$

single cut =  $\text{average (H)} - \text{average (B)} = 2.7 - 2.3 = 0.4\% (<0.8\%) \Rightarrow \text{Exc}$

average(H) = 2.7%  
 average(B) = 2.3%

**Variation girdle height**

variation girdle height (B & H) =  
 $\max(B\&H) - \min(B\&H) = 3.4 - 2.5 = 0.9\%$

variation girdle height (V) =  
 $\max(V) - \min(V) = 1.5 - 1.5 = 0\%$

variation girdle height =  $\max[\text{variation girdle height (B & H) \& variation girdle height (V)}] = 0.9\%$

single cut =  $\text{average (H)} - \text{average (B)} = 2.6 - 2.5 = 0.1\% (<0.8\%) \Rightarrow \text{Exc}$

average(H) = 2.6%  
 average(B) = 2.5%

**Variation girdle height**

variation girdle height (B & H) =  
 $\max(B\&H) - \min(B\&H) = 3 - 2 = 1\%$

variation girdle height (V) =  
 $\max(V) - \min(V) = 1.5 - 0.5 = 1\%$

variation girdle height =  $\max[\text{variation girdle height (B & H) \& variation girdle height (V)}] = 1\%$

single cut =  $\text{average (H)} - \text{average (B)} = 2.5 - 2.5 = 0\% (<0.8\%) \Rightarrow \text{Exc}$

average(H) = 2.5%  
 average(B) = 2.5%

Illustrations: WTOCD

## Conclusion

The proportion grade is based on the average of the measured values. If there is a large deviation on one or more values, the beauty of the diamond can be influenced. The table below shows the influence of symmetry and/or polish on the final proportion grade.

<b>Pol. / Sym.</b> <b>Proportions</b>	<b>Excellent</b>	<b>Very Good</b>	<b>Good</b>	<b>Fair</b>
<b>Excellent</b>	Excellent	Excellent	Very Good	Good
<b>Very Good</b>	Very Good	Very Good	Very Good	Good
<b>Good</b>	Good	Good	Good	Good
<b>Fair</b>	Fair	Fair	Fair	Fair



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